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GAS JOURNAL

LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

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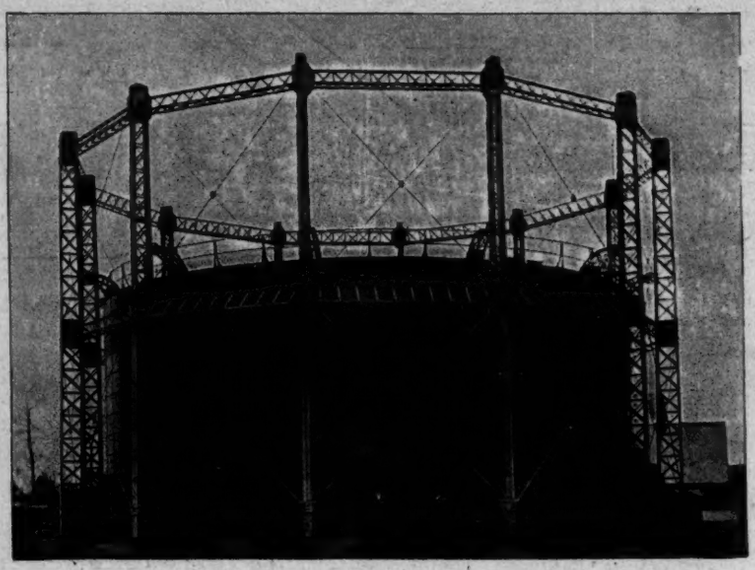

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VOL. CXXXIX., No. 2825.] TUESDAY, JULY 3, 1917. [69TH YEAR.

EDITORIAL NOTES.

The Threatened Dissolution of Unity.

IT does not necessarily follow that because for the moment there are no visible ripples on the surface of the pool of affairs relating to organization in the gas industry, there is no life underneath ; nor does it follow that, though proceedings are removed from the present gaze of those concerned, the results of schemings in connection with organization and headquarters will be acceptable to the whole industry. After what has happened, there will be in many places a very close scrutiny of whatever is put forward, and from whatever quarter. It is abundantly clear that for the gas industry in regard to these matters a critical time has set in, just when its ranks ought to be closing-up into solid formation for the purpose of attacking the work that lies before. It is quite the traditional way of the industry to be doing something that is inimical, or neglecting something that is necessary, to its vital interests. But it had been devoutly hoped that, rubbing shoulders as we are now doing with momentous progressive developments, the old element of stubbornness against complete organization of forces would have died a natural death, and that the very people who clog the wheels that were moving to the maximum attainable security for the industry would before this have been ranked among the most earnest advocates of the largest measure of unification. On them rests grave responsibility—to-day more than ever. This is said with knowledge. Our previous articles on the subjects of organization and headquarters have brought us opportunities of ascertaining the views of men in the industry who have considered these matters as questions of policy in relation to the conditions of to-day, rather than as principles that are old and corroded and altogether out of keeping with the changed times. As a result of these opportunities, we are sorry to say that serious cracks are found in what had already become a fairly good concrete foundation to the organization of the industry. It is felt a warning must be uttered, because, unless there is adroit handling of the situation, support will be withdrawn from the organized effort which it has cost so much thought and labour to build up; and this withdrawal of support may come from not only one section of the industry—just when most and so urgently needed, and just when it will be a heavy sacrifice to lose even a part of it. The saving of the position may be summed up in the word "comprehensiveness," which comprehensiveness can do no one harm, but the whole industry much good.

When writing upon "The Muddled Building Scheme," we spoke the other week of the members of the Society of British Gas Industries, and the absurd setting-up at the financial point of a boundary to co-operation with them, and debarring them from participation in the activity at the centre of operations. The same in the headquarters' scheme. It was also pointed out by us that there are people in the gas supply industry who feel there is a question of honour here, who feel that having taken the Society into partnership so far, the seal of completeness should be put upon it; and there is a determination among them that, whatever the recommendations, they will have nothing to do with anything that is tantamount to a breach of faith. The suggestion was made in the same article that it would be a good thing, if there is a substantial case to be put forward for drawing the line at some point short of full co-operation, to make it known, so as to have a settlement of the uncertainty, instead of letting the present singular position continue to be masked by an undignified silence. The challenge remains unanswered; courage fails to raise its head from the profound silence. Why the reticence? Why the fear? Courtesy has its claims; and so have past co-operation and partnership the right to a full explanation. Men's voices are heard avowing the belief that, though there is weighty evidence that the necessities of the industry demand the bonds and influences of stronger organization, sufficient unity and collaboration are possible under a system of segregation. But they fail to show why there should be segregation, or how the most effective co-operation and collaboration can be obtained by association in the precincts, but not in the internal parts, of organization. Our Army is a complete organization of several parts; but its efficiency as a fighting force would be greatly impaired if a single part was left unattached. The fullest co-operation and collaboration cannot be realized without the closest unity of every necessary element.

And those who make the plant by which gas is produced, purified, and stored, and by which the residual products are dealt with, and the appliances by which the gas is consumed, are an essential element in any constitution or in any movement that aspires to represent the whole industry. Without the plant the gas cannot be made and the residuals handled; and the appliances by which gas is consumed are as necessary to the gas business as the gas itself. Yet there are those who make and sell gas—thank goodness there are few with such narrow minds—who say that purchasers and sellers ought not to associate in a central organization. If this were the opinion of the whole industry, then we would say no more; but it happens not to be. It is certainly not the opinion of many men of sound judgment who make and sell gas, and who regard the opinion as a sign of miserable weakness. If it were the general view, then, without further controversy, we should say (despite the many years during which we have endeavoured to stimulate action in perfecting the industry's organization in order to invest it with the maximum realizable power) better far to have perfection in separation than attempt to cause cohesion among what were so universally adjudged to be incompatibles. But fortunately it is not the general view; and therefore we do urge those who feel aggrieved not, until it is seen how things actually shape, to do anything that will help to wreck the degree of organization which has been so far achieved. We cannot help believing that, although there is a small part of the members of the gas-supply industry who think that it is quite impossible for purchasers and sellers to associate, and who ought in consequence themselves to be shunned by every gas consumer and every patron of their secondary products, the time will come when they will see that the truest interests of the gas industry will be best promoted by the intimate association of those who make gas-manufacturing plant and gas-consuming appliances and those who make gas. The one is necessary to the other, the one is equally important as the other, in the march of development. Progress achieved by collaboration is much more important than persistence in the petty attitude as to the impossibility of any true cohesion between buyers and sellers. Buyers and sellers, what of? Technically made products! Products by which the common interests are mutually advanced. But the makers of the one product, so it is submitted, cannot associate with the others—only so long as it suits their convenience. We cannot see a rational side to this argument; and in like case are many others in and of the gas-supply industry who are ardent for the best means of advancing its interests. With all sincerity we do urge upon everyone in the gas industry not to let the unity so far achieved be dissolved, if by going only a little further, absolute unity of forces, of endeavours, and of good feeling (which alone is worth much) can be assured,

Coal Redistribution and the Price Limitation Act.

THE last "job" any man in his right senses would desire to take up, unless in the interests of the country at a time of exigence like the present, is that of Coal Controller; and by the day that Mr. Guy Calthrop has done with the work of endeavouring to harmonize supplies, conveyance, and requirements, he will have had an unrivalled experience in effort to placate discontent and to bring within parallel lines interests that widely diverge. He is working on new ground, and under conditions that are about as obstructive to smooth procedure as anything could possibly be, which, of course, is the very cause of his appointment. We can only admire the courage of Mr. Calthrop, and admit to harbouring no trace of envy of him in his gigantic task. It is probably a good thing for the nation that he himself was not pre-informed as to the magnitude of what was before him, or he might have declined the invitation to undertake the service. However that is a reason for making the Controller's task as light as possible, by every coal user doing his part to try to aid in securing a success for the schemes devised by him in collaboration with men of experience in the different applications of coal.

The Coal Controller has recently addressed the members of the Incorporated Municipal Electrical Association much the same as he did previously the members of the Institution of Gas Engineers. There is one thing very clear from the later statement and appeal; and it is that Mr. Calthrop's opinion has decidedly hardened as to the difficulties of securing supplies next winter owing to the inadequacy of conveyance in relation to requirement. If, he said, the war were to end to-morrow, the transport difficulty would not cease next winter, and, as a matter of fact, the difficulties will any way be aggravated. These words contain in them a depth of gravity which no coal user can afford to ignore; and although the electricity industry—including electric tramways and railways—uses less than seven million tons of coal a year, the Coal Controller, on the principle that every little helps, appealed to electrical engineers to adopt every means to reduce their consumption of coal, and to stock so as to save winter transport as much as possible. Of course, if the electricity undertakings can fit their boilers for the use of coke, or a lower grade fuel than the coal ordinarily used (such fuel being procurable) they can render aid in this way; or, without specially fitting some of their boilers, if there is plenty of spare steam power, they can still use inferior fuels. Otherwise, their help in alleviating next winter's traffic difficulties must be limited to fuel stocking in summer. In passing, there is one point in Mr. Calthrop's remarks to the electricals to which we may refer. He confesses that he is not a technical man other than in railway matters; and, this being so, excuse can be made—unless it is a case of misreporting—for such a statement from him as "electrical undertakings represent the most efficient coal "users in the country." The electrical engineers present must have been mightily tickled over this, as there flashed across their minds the data as to the amount of thermal value that goes into their boiler furnaces, and the resultant exiguous thermal value that is available at the consumers' terminals. Nor would the Ministry of Munitions be satisfied, in view of their requirements, to regard the electrical undertakings as the "most efficient users" of coal in the country.

Among the qualifications for a Coal Controller is the capacity for parrying awkward questions; and there were some thorny ones put at the meeting of the electrical engineers, who did not expect Mr. Calthrop to sit and listen to any long rambling speeches incorporating merely speculative and personal views having little bearing on the points of imperative necessity, and the satisfying by prevision of the needs of the country when these needs will be at the maximum, and the means of meeting them at their minimum capacity. The most interesting of the inquiries had reference to the operation of the Price of Coal (Limitation) Act under the working of the coal-redistribution plans which the Coal Controller has before him. The Act and his plans appear to have an uncompromising relationship. In the newly issued conditions as to the sale of coal, which are dated June 28, it is directed that "no coal shall be sold by collieries for con-"sumption in the United Kingdom except at the maximum "price under the Price of Coal (Limitation) Act," which direction appears to be at variance with the intention of the Act, which was to fix a maximum without binding generous coal owners to charge less if they found it possible, and were willing. But here the decree runs: "No coal shall be sold ". . . except at the maximum price," &c. However, that by the way. The interesting point raised by the electrical engineers is as to how the Controller's redistribution schemes are going to be brought into harmony with the Price Limitation Act; for under these schemes he is going to sever quondam contractors and customers, and alter the conditions on which coal was purchased in the twelve months ending June 30, 1914, which conditions are fundamentally essential to the operation of the Act. This is a matter on which Mr. Calthrop was evidently unprepared with a reply; for he suggested that it was one which should be brought to his notice in specific cases of hardship. Another point was whether, if buyers were put to additional expense owing to the operation of the re-organization scheme, the Government would compensate them for the difference. The retreat from this question was the obvious one that the Coal Controller has enough to do in other directions without being saddled with financial obligations of the kind.

But an equally, if not more, important question is as to the values of the coal which the redistribution will bring to users. The coal for steam users may be of lower value in respect of calorific power and ash; and consequently more would have to be used, and probably more boiler power would be required. For gas making the coal may be less valuable; its coking qualities may not be so good; and the volatile matter may be such quantitatively and qualitatively that results in other secondary products will suffer. These are important questions from the monetary point of view; but commonsense should indicate that there cannot be this general geographical rearrangement of the supplies without some adverse effects are felt. It is obvious that in such times individual interests must give way to the general welfare. This, however, is a further matter on which nothing definite could be said by the Coal Controller. But there is the question of cleaner coal. The adulteration of coal by the inclusion in it, and the sale at the price of honest coal, of useless material—subjects treated upon in a communicated article and an editorial in the "JOURNAL" for June 19—are both serious questions just now, when in every direction the handling of such material means to the country uneconomy and a dead-loss of efficiency. Mr. Guy Calthrop was asked if he could do anything to get cleaner coal; and his reply was that he would assist in dealing with complaints if furnished with the names of collieries from which the dirtier coal came. This so far may be satisfactory. But as to the problem of how to bring about friendly relationship between the Price of Coal (Limitation) Act and the coal redistribution scheme, the solution, if found, has not been divulged.

Munitions—War and Industrial.

A GRAPHIC story was told in the House of Commons last Thursday by Dr. Addison, the Minister of Munitions, regarding the wonderful organization—created by hard work and perseverance—of which he is the Government head, and which is a manifestation of the capacity and indomitable will of the country when "put to it." Into the details which he narrated as to the ramifications, output, and resources of the department, we cannot enter; but the fact that he spoke so freely, and opened to the gaze of the enemy so much that is anything but "contemptible," reveals a confidence in the position which will be very far from pleasant reading by the Central Powers. Among much else, Dr. Addison told how the capacity for the production of high explosives in March, 1917, was four times more than that of March, 1916, and twenty-eight times as great as that of March, 1915. This is a remarkable achievement, and not only so, but one which should for ever stand in the history of the war to the credit of the participants. We know very well in the gas industry that, if need be, the cited figures could be further enlarged. For the ungrudging service that has been rendered by men in the organization of work that has enabled this country to counter, with rapidity and powerfully, the years of careful systematic preparation for war by the Central Powers, there was acknowledgment by the Minister. Prominent among the names are those of Lord Moulton, Sir Arthur Duckham, and Sir Stephenson Kent. But though high explosives were at the front of what this country and her Allies lacked at the beginning of the war, and though the gas and coke-oven industries set-to with right good will to supply the deficiency, and to enlarge the stream of output until it had swollen to the sufficiency which empowered Dr. Addison to quote the extraordinary figures that he did as to production, not once in this part of his speech

did he specifically refer to the industries that are the sources, and that when appealed to so energetically put forward their strength. True he had much material for the speech; but the gas and coke-oven industries are not insusceptible to a little pat on the back, any more than are individuals. Probably Dr. Addison intended the gas industry to understand it was included in the reference to chemical industries. But whether or not that be so, our remonstrance is justified by the disappointment on the part of Sir William Pearce with the pittance of tribute paid to the chemical industries.

However, there are other parts of the speech in which the gas industry is directly concerned, as they bear not only upon the present but the future of the industry's economic situation. The home position of sulphate of ammonia is well known to-day; its future is not. It is all going to resolve itself into a question of cost of production, which will after the war govern commercial supremacy. The Ministry of Munitions takes some credit to itself that the country is, without large importations, provided as well as it is with fertilizers. Quite apart from sulphate of ammonia from gas-works and coking plants, the department has been fostering the production of cyanamide, as well as the utilization of nitrogen from the air. A great lesson has been learned from Germany, which is absolutely independent of nitrates from Chile through the inexhaustible atmospheric source of nitrogen. It is the intention that in future this country shall have less reliance upon the overseas source of supply. If sulphate of ammonia produced by the carbonization of coal is going in the time to come to suffer depreciation in market value, it is certain that nitrate of soda will be in still worse case. The time is undoubtedly coming when there will be keen competition in the fertilizer markets at home; but keener still will be the competition with Germany in the overseas markets.

In this connection after the war there ought to be cheaper sulphuric acid than before. Its production has through war requirements undergone large development in both private and Government factories. "Whatever arrangements," remarked Dr. Addison last week, "are made for "the future, it is essential to secure that sulphuric acid is "made available to *bonâ fide* users at fair rates; for if this "is done it should lead to the establishment of an impor-"tant group of new industries." Sir William Pearce, as an old sulphuric acid maker, does not at all like the position of things. He sees an after-war redundancy. There will be, he supposes, at least 400,000 to 500,000 tons of sulphuric acid available, "which will be too much for the country." The complaint is one with which the Ministry of Munitions is very familiar, states the Parliamentary Secretary to the Ministry (Sir Worthington Evans). Trust the chemical manufacturers for always being on the scene betimes, and looking after their own interests! The gas industry knows them and their methods, and the avenues of approach which parliamentary representation gives. The Ministry, says Sir Worthington, is already in consultation with the trade affected, and will continue in consultation, with the view of getting a scheme elaborated which, without sacrificing Government assets, will do no injustice to those who were in the business before the Government came in. It may be suggested that the department might, in order not to be one-sided in the counsel received and in its consequent action, also take into consultation those who are users of sulphuric acid, and who have long experience not only of the sulphuric acid market, but of certain purchasing methods of some of the chemical manufacturers, and of their love for self-protection. To return to Dr. Addison's speech, it is further noted that he can offer no prospect of better supplies of steel to private users. The output has been increased; so much so that after the war the country will fortunately find itself with a capacity for steel production 50 p.ct. greater than before the war. Sight, too, must not be lost by an industry dealing in industrial power and heating, of the fact that the Ministry of Munitions is concerning itself in the provision of cheaper power and the utilization of inferior coal.

But through the work of the Ministry of Munitions perhaps more than any other Government department, there has been an awakening to the country's several industrial defects, and to the fact that the Germans had got control of, at any rate the upper hand over, industries or parts of industries that are vital to the progress of the war and to the maintenance of improved peace industries. But reaction is not going to be tolerated; and the Government appear to have made up their minds that the country is going to duly benefit by its dearly won lessons, and by the profitable utilization of the equipment that it has brought into being for the immediate purposes of the war. That is all good. Industries have made mistakes, have been lethargic, and have been negligent. But the Government have not to look far to find that within their own limits there have been mistakes which are accountable for many a tragic tale. There have been mistakes, too, of a legislative kind; and one of the important lessons that the Private Bill Authorities have yet to learn is that it is a dangerous thing to interfere, by restrictive legislation, with the natural development of industries. Where would the country and her Allies have been to-day had it been impossible for the gas industry to have developed its processes for dealing with secondary products? Never before has there been such severe and substantial condemnation of parliamentary interference with the industry's development. Large plants have been erected at Government request, much capital has been expended, much work has been done. The pampered and protected chemical industries could not have saved the country from defeat, as the industries engaged in coal carbonization have done. It is not the old gas industry that will have to be dealt with after the war, but a gas industry made what it has been by the requirements of the war, and by the lessons of which all intelligent men intend to take advantage. There may be a few obstructives; but the country is in no mood for a repetition of their tactics.

Wounded British Gas Men in France.

International alliances and covenants ratified by, and bearing the seals of, great Powers are instruments of vast importance to the world, providing their keeping is in the hands of honourable men. But there are acts of less formal kind—acts prompted by the heart—which are the best evidences of a genuine bond of human sympathy and friendship. One such evidence has lately been received by the President of the Institution of Gas Engineers (the Right Hon. Lord Moulton) from the President of the Société Technique du Gaz en France (M. Rouland), which will be profoundly appreciated by members of the British gas industry. From the ranks of the British gas industry, there have gone considerable numbers of men to fight side by side with the sons of France. Many of these men have, in their devotion to honour and country, lost their lives; others have been maimed or wounded, or otherwise incapacitated. Some of these are probably lying suffering in hospitals in France. M. Rouland moved not only by the alliance between the two great Powers, but by humane and fraternal feelings, pledges himself (as will be seen by the correspondence published elsewhere in this issue) and his colleagues of the Société Technique to do all that may be possible in the way of personal visits and providing means of alleviating the conditions of such officers and men. But this kindly intention cannot be carried out unless they are furnished with the names and other particulars of the officers and men—not omitting to mention the undertakings in whose service they were prior to the war, and the hospitals where they are now to be found. To Mr. Walter T. Dunn, Lord Moulton has very properly delegated the task of compiling such a list; and for this purpose the officers of every gas undertaking with, or the relatives or other friends of, men lying wounded or otherwise ill in the hospitals of Paris or the Provinces are requested to communicate the necessary information direct to Mr. Dunn as early as possible. Lord Moulton has dispatched a message to M. Rouland, on behalf of himself and the Institution of Gas Engineers, stating how deeply he and they are touched by this sympathetic thought, and expressing grateful thanks. Already strong ties exist between the gas professions of France and this country; but this kindly desire to make the wounded men of the British gas industry feel that they are near to and cared for by friends in the French gas industry will still further tighten these ties.

Tar-Fog Extraction and Oil-Washing.

Formerly it was thought that tar-extractors of well-known types were efficient for preventing the clogging of scrubbers by tar and the detrimental effect by it upon other parts of the gas-manufacturing process. But since, with the advent of oil-washing, it has been found that a higher efficiency in the pre-removal of tar fog is a distinct advantage to both the process and to the

wash-oil. In later columns this week, we describe and illustrate a method of tar-fog elimination patented by Messrs. Fisher and Fiddes, of Tottenham, which has, tests indicate, a very high efficiency relative to the old tar-extractors. An average extraction, under Tottenham conditions, of 33·5 gallons per million cubic feet of gas is a figure that not only speaks of efficiency, but of ingenuity in the devising of the new method, which can be simply, conveniently, and, in view of the results, inexpensively applied. There is no reason why the services of the new extractor should not be utilized on the smaller works as well as on the larger ones. Several of the former have gone into oil-washing because they want to do their maximum part in the service of the country, while others for commercial considerations will follow the practice as soon as possible. For all works, no matter the size, it is clear that trouble will be saved, and efficiency will be enhanced, by taking the route that leads to the elimination of tar fog in the most complete manner. Gas engineers generally will be interested in the data we give in the descriptive article as to experiences at the Tottenham Gas-Works, where the Engineer and General Manager of the Company (Mr. A. E. Broadberry, M.Inst.C.E.), has had the arrangement under trial, with the beneficial results recorded.

The Incidence of the Increase in Price.

A question of considerable difficulty for the responsible officials of gas undertakings when preparing their budgets, and finding themselves faced with a large increase of expenditure, is to determine on which branches of the business, and by how much, the charges should be advanced in order to provide sufficient revenue to counterbalance the augmented outgoings. Where there are long-period contracts and a coal clause, the difficulty is not great as to what should be done; and, in normal times, upon all other classes of consumption, it is easy enough, if the prices of the competing agents will allow, to arrange for something in the nature of a *pro ratâ* increase. But in these times other considerations may prevail, if there is a fair assurance that permanent injury will not result. In considering an increase of price for gas, with extraordinary war charges for materials and labour to be met, it is fair to take into account the relation to actual costs of the revenue derived from the different sources of business, and to put the larger part of the increase upon the least profitable branches per 1000 c.ft. If the lighting business is paying well under present conditions, and the manufacturing consumption is not, then it is quite fair—more especially as the latter is productive consumption—for the industrial business to bear a large part of (perhaps the whole of the) increased cost. This may savour of a reversal of the advocated policy of encouraging the daylight load. There is no such intention.

Temporary Expediency and Exceptional Circumstances.

There is a question here of temporary expediency under exceptional circumstances. In factories that have been turned over to munitions work, the day load frequently now (excepting perhaps in the summer time) runs far into the lighting hours. Such factories are, as a rule, doing extraordinarily well; and their power and heating agents are serving their profit-making. At the moment, competition between gas and other power and heating agents is not a very serious question as in ordinary times, when the electricity purveyors, finding themselves hard-pressed in the competition, have to sell energy for power and heating at figures that are but the shadows of those they charge for lighting. They would not do this unless compelled by the circumstances that a horse-power-hour requires approximately 0·75 unit, and that the thermal value of a unit is only 3420 B.Th.U. Just now electrical undertakings are in the same state as gas undertakings. Unless the extra supply is needed for munition purposes, they cannot get money for extensions; and, like gas undertakings, it depends greatly on their internal financial conditions as to whether they can do anything much in the way of extending business on the district. Current conditions can therefore be brought into account, as well as equity and expediency, in considering the question of the incidence of increased charges.

The Case of West Bromwich.

Take West Bromwich as a case in point. There the Engineer and Manager (Mr. W. H. Johns) has been considering the position, in conjunction with the Borough Treasurer (Mr. H. Kirk). It is estimated that the expenditure of the gas undertaking will amount to roughly £5000 more this year than last, after deducting increased coke receipts (the details can be seen elsewhere in this issue). On the total sale this is equal to 3d. per 1000 c.ft. The prices for lighting, according to quantity, at present range from 2s. 7d. to 3s. per 1000 c.ft., less 5 p.ct.; and for prepayment supply, the charge is 3s. 6d. For power and other manufacturing purposes for less than 200,000 c.ft. 2s. 1d. is charged, for above 200,000 c.ft. 1s. 10d., both less 5 p.ct. Last year the total cost of gas, after deducting the income from secondary products, was equal to 1s. 10·43d. per 1000 c.ft.; and with interest and sinking fund, the inclusive cost was 2s. 4·48d. The average price obtained for motive power and manufacture was 1s. 10·46d. Now having regard to the facts that there was a net profit last year of £3011, that rather less than 36 p.ct. of the consumption was for manufacturing purposes, and that about 86 p.ct. of the manufacturing consumption was sold at 1s. 10d., it is clear that the lighting consumers are, under present conditions, already through their charges doing their fair share, and are the ones who provided the net surplus last year. This being so, Mr. Johns, in collaboration with the Borough Treasurer, advised the Gas Committee (who have agreed) to alter the incidence of the scale by raising the charges for manufacturing purposes and bringing them closer together. The price will now be 2s. 4d. per 1000 c.ft. for less than 1 million c.ft., and 2s. 3d. above. This, on the basis of last year's sales, will contribute an additional £3000, and the net surplus (obviously provided last year by the lighting and domestic consumers) will be less by £2000—thus meeting the estimated higher expenditure of £5000. Under current conditions, whatever expediency may have to say at other times, the decision appears to be perfectly fair.

Exports of Coal, Coke, and Patent Fuel.

The Board of Trade returns for May as to the exports of coal, coke, and patent fuel show a continuation in the reduction of the quantity exported, and an increase in the total value. The quantity shipped in the month was 3,664,823 tons, which was a reduction on May, 1915, of 302,834 tons, and on May, 1916, of 160,564 tons. But values indicate no inclination to recede. The value of the exports in May last was £4,909,384, or £1,366,409 more than in May, 1915, and £118,924 more than in May, 1916. When these values are compared with the quantities of coal, coke, and patent fuel that left our shores, there ought to be considerable satisfaction on the part of those who have had the business. Taking the five months ending May, the total quantity exported was 15,795,303 tons, or a reduction on the five months ending May, 1915, of 3,856,448 tons, and on the same period of 1916 of 1,205,429 tons. The value for the five months amounts to £20,963,021, or an increase on the corresponding period of 1915 of £5,546,421, and of £2,411,837 on 1916. The average value of the exports in May last was £1 6s. 9d. per ton, which is 1s. 9d. per ton more than in May, 1916.

The Nitrate Half Year.

It is recognized by Messrs. W. Montgomery & Co., Ltd., in their half-yearly nitrate of soda report, that at the present moment the compilation of statistics of real value is a very difficult, if not impossible, task. Prices free on board in Chili have shown a variation during the six months amounting to about 25s. per ton. Early in June, the price was 9s. per quintal for 95 p.ct., immediate shipment. But towards the middle of the month the market improved; and at the close prompt ordinary was quoted at 9s. 7d. It is, however, doubted by the firm whether, in view of the enormous stock on the coast, there is any justification for the advance which has just taken place. At the moment, exports are on a very reduced scale, indicating that the scarcity of tonnage is becoming more acutely felt as time goes on; and under these conditions, they find it difficult to see how prices f.o.b. Chili can be maintained. Stocks in Chili amount to 920,000 tons, which is regarded as fairly heavy, considering that production has rather a tendency to increase than to decrease. Looking at the future, Messrs. Montgomery remark that it is a long cry to next season; and for those who have no further use for the article until then, a waiting policy is suggested. While admitting that many things might happen between now and next season, they doubt if the buyer will have to pay more, if the article is available at all. Meantime, as is truly said in the report, buyers will doubtless be filling some of their requirements of nitrogen from sulphate of ammonia, under the new regulations

of the Board of Agriculture. In addition to sulphate of ammonia, too, Messrs. Montgomery see in synthetic nitrate a possibly formidable competitor with the Chilian article after the war. They are of opinion that it might be well for producers and importers alike to keep this subject ever in view; for, "owing to war necessities, developments in science are rapid, and that which might take twenty years to accomplish in peace times may be brought about in one or two during war."

PERSONAL.

A further member of the French gas industry to receive the distinction of membership of the Legion of Honour for his military services is M. RAYMOND CASAUBON, the Manager of the Brussels works of St. Josse-ten-Norde. M. Casaubon was captain of artillery attached to the staff of one of the French armies.

At the annual general meeting of the Société Technique du Gaz en France, recently held in Paris, honorary membership of the Society was conferred upon the Rt. Hon. Lord MOULTON, K.C.B., F.R.S., the President of the Institution of Gas Engineers for 1917, and on Sig. ENRICO SOSPISIO, the President of the Italian Association of the Gas and Water Industry.

We are pleased to learn from a reliable source that Mr. HAROLD W. GANDON, who is in the service of the Imperial Continental Gas Association at Buda Pest, is carrying on business as usual for his Company, and, so far as can be made out, is meeting with very good success. We are also assured that Mr. Gandon and his wife are in the best of health, and although suffering from the natural privations caused by the war, are still cheerful, and are treated with consideration and respect by the Bohemian people. Their only trouble is home sickness.

Mr. T. Brown, the Manager of the Matlock and District Gas Company, has received official information that his second son, Lieutenant J. W. BROWN, of the R.F.C., is lying at Dar-es-Salaam (Africa), dangerously ill with concussion of the brain. The cause of the illness is not stated; but it is assumed that he met with an accident or was shot down while piloting an aeroplane. The unfortunate officer, who is 31 years of age, was Manager of the Barbados Gas-Works (and formerly of Port Elizabeth) before joining the Colours. Prior to going abroad, he was Manager of the Chapel-en-le-Frith and Whaley Gas-Works. His younger brother, Lieutenant R. O. BROWN, of the Sherwood Foresters, is in a Newcastle hospital, suffering from septic poisoning.

OBITUARY.

Mr. ROBERT BURR, who was wounded at the Western Front on the 18th ult., and died the same evening, was a student member of the Institution of Gas Engineers. He served as an articled pupil to Mr. J. C. Belton at the Chester Gas-Works, and at the time of joining-up was Assistant to Mr. Belton. In December, 1916, he joined the army, and after a short training was sent to France, where he served with the Chemical Section of the Royal Engineers. He was the younger son of the late Mr. B. Shaw Burr, tar distiller, of Thorne, and was 23 years of age.

A leading personality in the French gas industry has passed away with the death, at Lyons, on May 31, of M. MAURICE PIATON, who, as Director of several gas and other companies, had taken a prominent part in both technical and business affairs during the past twenty-five years. He was President of the Société Technique in 1901 and 1902; and at the Toulon Congress in 1903 he afforded his colleagues the opportunity of inspecting the first installation in France for mechanical stoking. One of the founders of the French Professional Gas Syndicat, he was its President for several years following 1909. The weekly holiday for employees, of which he was a supporter, was instituted during his term of office; and his influence and sympathy were applied in other ways in establishing co-operation between employers and employed. His death at the comparatively early age of 63 was the occasion of the payment of the warmest tributes to his technical knowledge and personal attributes by representatives of the institutions to which he had unsparingly given his services.

Royal Society of Arts.—In the report of the Council which was submitted at the recent annual meeting of the Society, it was remarked that nearly all the papers read or addresses delivered at the meetings during the past session dealt with subjects connected with the war. There were, among these, the address of Mr. Dugald Clerk, D.Sc. (the Chairman of Council), on the "Stability of Great Britain;" the paper by Mr. C. M. Whittaker, on the "British Coal-Tar Colour Industry;" that by Dr. J. A. Voelcker, on "Agricultural Fertilizers;" Mr. Dugald Clerk's "History of the Internal Combustion Engine;" while Mr. H. M. Thornton, "who two years ago gave the Society a valuable paper on the uses of coal gas for industrial purposes, supplemented his former contribution by one showing specially to what a large extent coal gas was used as a fuel in the production of munitions."

CITY AND GUILDS EXAMINATION PASSES.

IT was to have been anticipated, with so many of the younger members of the industry away on active service, that the request made in last week's "JOURNAL" [p. 617] to the secretaries and managers of gas undertakings, teachers, and pupils to send on the names of those who passed in the recent gas examinations would not result in a very long list being received. There must, however, be many more successful candidates than those mentioned below; and we shall be glad to have their names for publication.

Gas Engineering.

FINAL GRADE—FIRST CLASS.

John Bradbury.
W. M. Gabbatt, Barrow-in-Furness.
Raymond Prince, Tipton.
W. Howard Wise, Tipton.

GRADE I.—FIRST CLASS.

C. J. Hibbard.
J. Francis Lloyd, Wrexham.
Percy J. Phillips, Cleethorpes.
Albert Wydooghe, Preston [a Belgian, 17½ years old].

GRADE I.—SECOND CLASS.

Herbert Banyard, Saffron Walden.

Gas Supply.

FINAL GRADE—FIRST CLASS.

John Bradbury.
Raymond Prince, Tipton.
G. Ford, Peckham, S.E.
R. D. Holgate, Dulwich, S.E.

GRADE I.—FIRST CLASS.

Herbert Banyard, Saffron Walden.

WOUNDED GAS MEN IN FRANCE.

Particulars and Location Wanted.

FROM Mr. Walter T. Dunn, the Secretary of the Institution of Gas Engineers, we have received copies of letters which have passed between the President of the Société Technique de l'Industrie du Gaz en France (M. Roulaud) and the President of the Institution (the Right Hon. Lord Moulton), with reference to British wounded who may be in the hospitals of Paris and the French Provinces. His Lordship desires us to say that he will be very glad if the relatives or friends of any officers or men belonging not only to the Institution, but who are in any way connected with the British gas industry, will send their names and particulars to Mr. Dunn, in order that effect may be given to the sympathetic wishes of the French Gas Society.

Société Technique de l'Industrie du Gaz en France,
12, Rue de Clichy, Paris, June, 1917.

The Rt. Hon. Lord Moulton,
President of the Institution of Gas Engineers.

Monsieur le President et Cher Collègue,—Having before me the formidable struggles which the valiant British Army is so tenaciously conducting on the Northern Front, my thoughts have turned to the many soldiers and officers that the gas industry of your dear country has furnished to the divisions of Marshal Sir Douglas Haig.

I therefore proposed to my Committee, and it was unanimously agreed, that our French colleagues should visit those members of your Society who may happen to be wounded and under treatment, either in the Hospitals of Paris or in those of the Provinces. I am certain that the members of the Société Technique will place themselves, so far as it may be possible for them to do so, at the disposal of your wounded compatriots in France.

If you will be so kind as to send us a list of such wounded members of the Gas Institution, indicating in which hospitals they are actually lying, we will make it a pleasure and a duty to take care of each one of them in the way of providing means of alleviating and helping them whenever possible.

Le President.
(Signed) ROULAND.

Lord Moulton replied as follows:

39, *Victoria Street, S.W. 1, June 26, 1917.*

Monsieur le President et Cher Collègue,—I duly received your gracious letter, and immediately communicated the contents of same to the Committee of the Institution of Gas Engineers.

These gentlemen have desired me to say how deeply they have been touched by the most sympathetic thought of their colleagues of the Société Technique de l'Industrie du Gaz en France. The desire of the latter to relieve and act as friends whenever possible to any members of our Institution who may be wounded and under treatment in French hospitals can only serve to tighten not only the very real bond of sympathy which exists between your Society and ours, but also the bond existing between our two great countries, who are now fighting side by side in the great war of civilization.

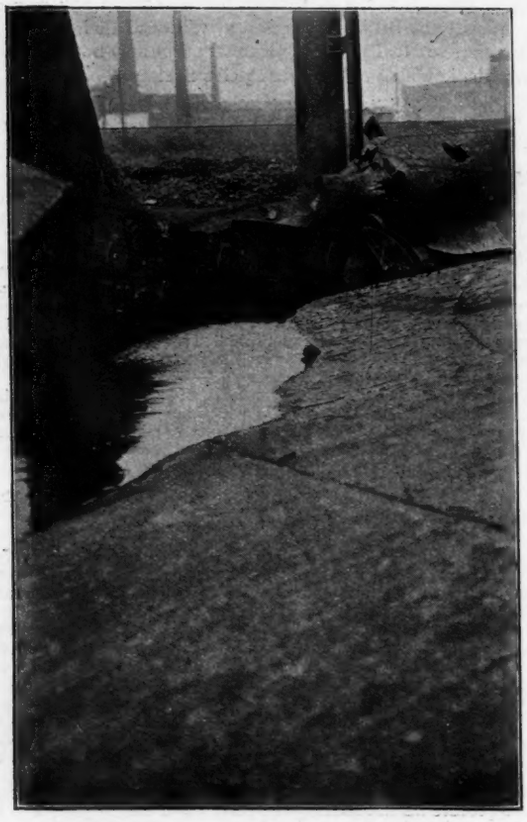
I have asked our devoted Secretary, Mr. Dunn, to take the necessary steps to procure the information so kindly asked for by you; and he has at once taken the matter in hand.

(Signed) MOULTON, President.

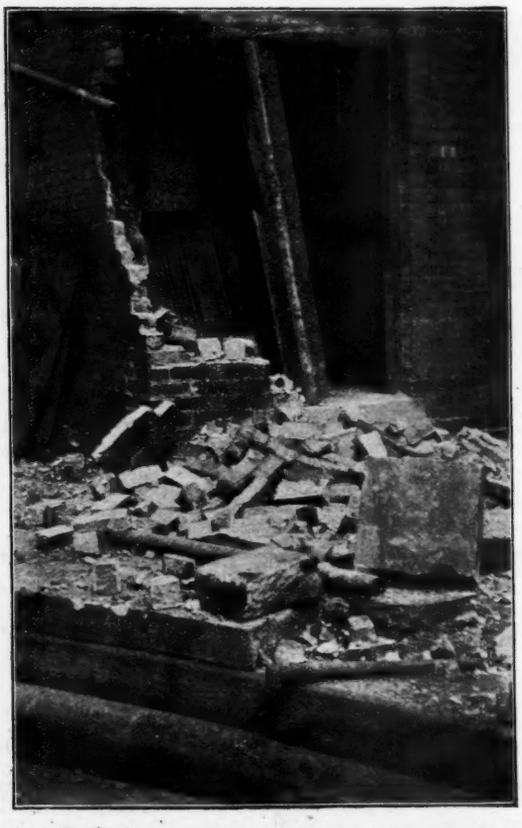
No. 1 GASHOLDER AFTER THE EXPLOSION.

WRECKED GASHOLDERS AT DUKINFIELD.

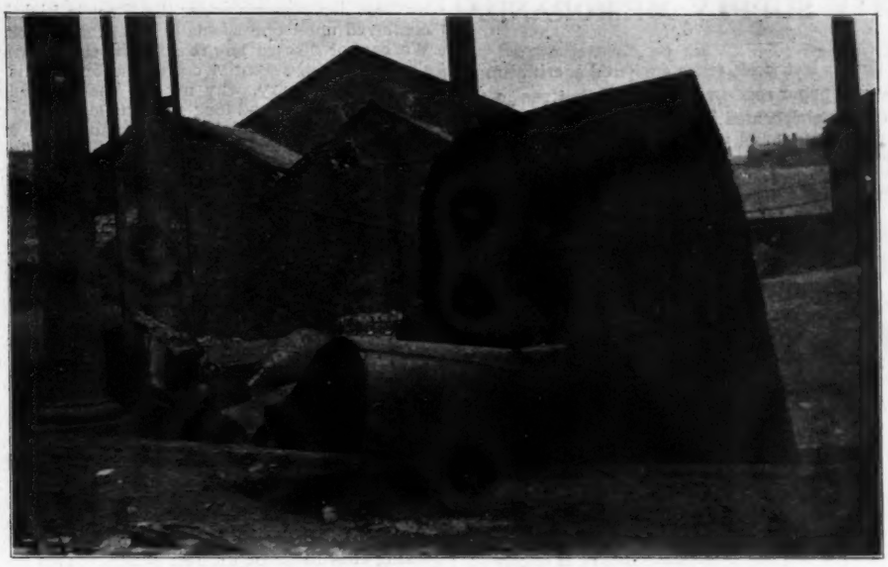
WE are now able to supplement the excellent series of photographs of the wrecked gasholders at Ashton-under-Lyne which appeared on pp. 620-21 of last week's "JOURNAL" by an equally interesting set of pictures of No. 1 gasholder and the engine-house at the Dukinfield Gas-Works, the damage to which was caused by the same explosion. For these we are indebted to Mr. William Lindley, the Engineer and Manager of the Dukinfield Gas-Works. The two holders at Dukinfield became affected ten minutes after the explosion took place at the chemical works. Both the holders were burst and put out of action; the one illustrated being reduced to practically a scrap heap. The other was punctured on the side and on the top. The roofs of the retort-house, coal-breaker house, smithy, and governor-house were severely damaged by the flying pieces of girders and machinery, as also were the walls of the governor-house and the gas-engine room. The oxide sheds were particularly badly damaged.



ANOTHER VIEW OF No. 1 GASHOLDER.



CORNER OF ENGINE-HOUSE AFTER THE EXPLOSION.



A THIRD VIEW OF THE No. 1 GASHOLDER AT DUKINFIELD.

COAL GAS FOR VEHICLES.

A Suggestion and an Example.

THERE was a somewhat curious coincidence in connection with two letters, both bearing the same date, which reached the "JOURNAL" office on Saturday morning. One of these was from a correspondent who, enclosing a cutting from a local paper on the subject of coal gas for light vans, said it had occurred to him that, as many gas undertakings have discontinued using their motor vehicles on account of petrol difficulties, it would be a good thing if some of them could be induced to use gas for motive power, and so put their vans on the road again, and advertise the new idea at the same time.

The second letter was from Mr. Norman S. Cox, the Secretary of the Sunderland Gas Company, who sent a photograph and a few particulars of a van which is being driven on coal gas, owing to the shortage of petrol, in connection with the clearing of his Company's prepayment meters—thus exactly meeting the suggestion of the other correspondent.

The vehicle is 20 a H.P. "Studebaker" delivery van, with a flexible gasholder on top, 10 ft. long by 6 ft. diameter, and having a capacity of 190 c.ft. With the holder fully inflated, the van will travel ten miles; and as no journey exceeds this distance, there is no difficulty in regard to charging, which is done (the time occupied being fourteen minutes) at the distribution department, where the car is kept, and from which point the slot-meter collectors work. The cost of conversion was £14; and the driver can switch-over to petrol again without difficulty, in case of necessity. The new arrangement has been a fortnight in operation, and has worked very satisfactorily.

Mr. Cox submits the following figures in the matter of working cost: 250 c.ft. of coal gas equals 1 gallon of petrol; and with gas at 1s. per 1000 c.ft. (which is the Company's lowest selling price), this is equivalent to petrol at 3d. per gallon. The contract price of petrol, however, being 2s. 1d. per gallon (2s. 4d., less tax returnable, 3d.), the saving per month, reckoning 50 gallons would be required, is £4 11s. 8d.

"Studebaker" Slot-Meter Collectors' Van, Driven on Coal Gas.

Yorkshire motor vehicle contracting concerns have observed the growing success of the new gas-driven cars in various parts of the country, under the restrictions and high cost of petrol. Harrogate has recently adopted it for buses, and now Halifax and Todmorden—two towns where the motor bus has been found more serviceable than tramcars on the hilly routes—have decided to give the new method of traction a trial.

Australia and the Manufacture of Benzene and Toluene.—The Department of Commercial Intelligence are, says the "Board of Trade Journal," in receipt of information from the High Commissioner in London for the Commonwealth of Australia, to the effect that the Defence Department of the Australian Government propose to erect plant for the production of benzene and toluene in the Commonwealth. The crude benzol to be treated will be obtained from the various Australian gas companies.

Protecting Gasholder Tanks from Ice.

Replying to a question in the American "Gas Institute News," with regard to a relief holder that was wrecked by the formation of ice at the bottom of the tank, Mr. R. A. Wallace, of Quebec, explains the method adopted by him for preventing trouble of this kind. In arranging the steam pipes and jets to our gasholder tanks, he says, we have found it necessary to distribute the outlets of the steam-jets at different levels, as well as round the circumference, to maintain the water in constant motion around the full surface of the sides of the tanks, while at the same time imparting heat from the steam. When this was not done, we noticed a tendency to formation of ice at the lower part of the tank-guides, and at the angle formed by the sides and bottom. For example, in the tank of our relief holder, which is 62 ft. in diameter and 20 ft. deep, we use six steam-ejectors, of a pattern resembling the old-fashioned gas-stove air mixers—a bulb-shaped casting with several holes drilled near its base where the steam-jet enters; the other end being tapped large enough to receive a larger pipe to form the mixing-chamber. The steam nozzle is carried about ¾-in. past the holes referred to; the supply-pipe being ¼-in. and the nozzle tapered to a $\frac{3}{16}$-in. jet. The mixing-chamber is of 1-in. pipe. The ejectors are located about 6 in. or less below the surface of the water. Two of the mixing-pipes are carried to within 2 ft. of the bottom, and two are made to terminate about halfway down; these four being in a vertical position, with elbows at their lower ends. The other two are placed horizontally, just below the surface; care being taken that all the outlets face in the same direction round the tank, so as to maintain a circular movement of the water.

ELECTRICITY SUPPLY MEMORANDA.

IN our editorial columns last week, there appeared a criticism of some of the points in a paper read by Mr. J. A. Robertson at the annual meeting of the Incorporated Municipal Electrical Association, in which he discussed the ways and means by which the electricity industry could aid in the fuel economy campaign. The "Electrical Review" described the paper as an "able" one; it did not strike us quite in the same light—probably because we did not examine the production from the same point of view. It is to be hoped that Mr. F. M. Long, the Electrical Engineer of Norwich, will not consider it a slight to his Presidential Address that precedence should have been given by us to a notice of a paper; the only reason for so doing being that the paper reached us before the address. The address was truly modest—in length and tone; but it was full of hope as to electrical development, and splashed here and there with evidence that Mr. Long is a believer in charity beginning at home. He claims special consideration and privileges for the electricity industry; while other industries—such as that trading primarily in gas and secondarily in other commodities—must look after themselves. Why special consideration and privileges, when Mr. Long is able to point to several thrusts outwards into fresh uses of electrical energy? He says the year marks the beginning of a new era in the work on which the electrical industry is engaged; for in it there have been taken the earliest steps towards the realization of that larger development of the use of electricity in the service of the country, with the possibility of which electrical engineers have for long years been familiar. To some extent British electrical engineers have been cajoled into thinking that certain of the commodities produced by water-power-derived electrical energy altogether put out of competition any similar commodities derived by the aid of their coal-produced electrical energy. But they have latterly been learning more and more as to the capital costs of water-power generating plant and of the freights for bringing the commodities from water-power blessed countries, which items somewhat alter the balance of advantage. The electric steel furnace has come. There are 27 of these now in Sheffield, ranging from 260 KW. to 3000 KW. Manufactories are being constructed in this country for the production of nitric acid and fertilizers from atmospheric nitrogen. There are also factories for making phosphorus and arcorundum—an abrasive material very similar to carborundum. All such new industrial developments which reduce imports are valuable; and, where they do not injure well-established home industries, they must be of great advantage to industries generally, either on account of direct patronage or the increased spending power which industrial developments help to promote. It is appreciated by Mr. Long that the development of manufactures in which other industries may be concerned—such as the chemical and dye industries to the maintenance of which the gas industry materially contributes—also helps to create other fields for the supply of electrical energy. Beyond, there is the research into the use of electrical energy for vivifying the growth of the earth's produce; and there is the use of energy on railways, canals, and for charging electric vehicles. The electrical industry is clearly looking on the future through rose-tinted glasses.

Diversity of New Business.

Lines of Development and a Control Board.

There are those enthusiasts who dream that many of these developments are coming to pass as if by magic. Mr. Long is not one of them. Large centralized power stations and expensive systems of wires carrying current up and down and across the country and above countless miles of hedgerows to the cities and towns and the small rural settlements, are not, in his opinion, coming into existence other than, if at all, by systematic growth and with time. The hypothetical balance-sheet has not yet been prepared which even suggests a gain in financial economy from such a course—capital expenditure and all included. It is all mainly mere guesswork. Mr. Long believes in being sane in such matters, and in going to work methodically—in starting with the present stations, and radiating out to pastures new, because it must necessarily be many years before it is possible to run bulk supply mains from stations in the coal-fields to supply such areas as (say) the eastern and the southern counties. The responsible engineer of each undertaking should therefore now consider the problem of expansion, and prepare a scheme to which effect could be given after the war. But uniformity ought to be a *sine quâ non*, with the view of possible eventual linking-up, or bulk supply. In other words, there should be a standardization of methods of distribution and appliances. Further, whatever schemes are adopted, they should be such that the existing undertakings do not suffer loss, but would share in the benefits of the lower costs of production which should result. But a fundamental necessity is the reorganization of Government control of the industry, together with the granting of additional powers. The Council of the Association feel that the control of municipal undertakings by three distinct departments of the Government—the Board of Trade, the Local Government Board, and the Home Office—is not at all satisfactory, and that the powers exercised by these departments under the Electric Lighting Acts should be conferred upon one specially constituted Department or Board. We cannot discern any reason why the electric supply industry should have preferential consideration in this way. If for the electricity industry, why not for the gas industry? It is an equally deserving and long-suffering statutorily controlled institution. The Board which would comply with Mr. Long's desires is one which should be free from political influence, should have full powers, should include engineers of extended experience of electricity undertakings, and the members should devote their whole time and interest to the business. The powers of action should be such as would enable the Board to deal without reference to any higher authority with all matters concerning electricity undertakings—excluding only the owning and operating of them. This is a very nice arrangement indeed. But again we ask, where is the possible justification for this special treatment for the electricity industry? With such a controlling body, we quite agree there would be some hope that "powers urgently required for the industry would soon be obtained." There is no question that procedure would be simplified, that matters would be more expeditiously dealt with, and that much of the present expense would be avoided. There is, however, a difficulty of a legislative and judicial order. A special body of the kind well weighted with an electrical element would look with religious fervour after the interests of electricity supply; other interests might go to the dogs. We have not the slightest fear that an *ad hoc* controlling authority for the gas industry would have the same tendency to rather neglect the interests of other industries in looking after those of its own *protégé*. This might not be to the common good.

Suggested Legislation as to Powers of Charge.

In framing the general procedure governing the powers of charge in the case of gas and electricity, too, Parliament has endeavoured to give a certain amount of elasticity to the suppliers, while at the same time protecting the consumers and other interests against unfairness. But the Municipal Electrical Association, abetted by the Association of Electrical Power Companies, propose to try to persuade Parliament that they are wrong, and that there ought to be still more liberty to a concern that can now charge for its commodity the fraction of a penny for one purpose and several pence for another purpose. The proposal has been incorporated in the Association's Electricity Supply Bill, which seems to be its hoary and ill-fated production in amended form. The measure now includes—besides the old wiring and hiring powers, preferential capital sanction, and many other things, some of which form a departure from the common rule—powers as to wayleaves, lines above ground, joint working, and methods of charging. The gas industry is especially interested in the last-named matter, seeing that it is only allowed to give discounts not exceeding a clearly-fixed maximum, "provided that all discounts shall be of equal amount under like circumstances to all consumers;" or, alternatively, provided that every contract "entered into shall be alike in terms and amount under like circumstances to all consumers." These enactments have the same effect as the preferential charges one which the electricity industry finds so irksome in its bargainings with people to obtain a transfer of custom from the gas industry. It wants to loosen its hands, and to keep the hands of the gas industry tied. Its notions of fair fighting are somewhat crude. Mr. Long says it has been found "necessary, in order to extend the use of electricity, to differentiate between charges for supplies of light, power, heat, &c., as well as to devise special methods of charging, the validity of which can only be settled in a Court of Law." In other words, the electricity industry cannot compete for power or heating supply unless they charge ridiculously low prices compared with the rates for lighting. This shows the limitations of electricity supply. The present position, according to Mr. Long, is not satisfactory; and what the Bill proposes is that power should be given to the Board of Trade to approve methods of charging whether for energy, stand-by supplies, or other services rendered. "Such methods would then have legal authority, and opportunities for vexatious litigation would be removed." In the cases that have so far been decided by the Courts, it has been seen that the opportunities for litigation were supplied by electrical undertakings breaking the law. However, it is feared that nothing can be done by the Association in pushing forward the Bill while the Board of Trade Committee is considering the question of electrical development, and what course of action is necessary thereto. A copy of the Bill has presumably been handed to the Departmental Committee. It is hoped they will be edified; and that, if they adopt the proposals, they will explain why the electricity industry deserves preferential legislation as against the gas industry. Should the Government create a special Board or Department for Electricity Supply, Mr. Long thinks the obvious course would be for it to take over the Association's bantling. The real importance of the measure is demonstrated by the fact that the industry gets on very well year after year without the preferential powers that are now sought for.

The Agitation and the Result.

The electricity industry is still seething with resentment over the action of the Board of Trade in connection with not only the constitution of the Committee on Electrical Power Supply, but because it prefers to conceal

certain reports already made by two other Committees—the Electrical Trades Committee Coal Conservation, and the Sub-Committee of the Reconstruction Committee. The number of local authorities who have protested against the constitution of the Departmental Committee has recently risen; and the power of resistance of the Board of Trade has given way under the strain, with the result that three additional members representing municipal interests are to be appointed. The announcement of this concession having deprived the agitators of their temporary "bone of contention," they have picked up another. "What about the representation of the electrical companies?" And we suppose this will be drummed into the ears of the Board of Trade until there will be a further reinforcement of the Committee. Meanwhile, the Chairman of the Committee (Mr. Huth Jackson) has resigned under medical advice. Of course, with the revision of its membership, the Committee cannot until there is final settlement get to solid work. The concealment of the two reports the publication of which is so anxiously wished for by the Electrical Press is a matter over which it is just possible that the Board of Trade are taking the correct course. Their circulation would only open the floodgates of discussion before the Departmental Committee have considered them and have—after so doing and hearing evidence and using their own brains—issued their own report. But someone has unkindly supplied the "Chronicle," "Daily News," and "Star" with information as to the main line of the contents of the report of the Sub-Committee of the Reconstruction Committee; and the result is confusion. It seems that the Sub-Committee favours the division of the country into areas—one account says sixteen, another seven—and that for each of the areas consideration should be given to the question of the reorganization and co-ordination of generation and supply. If this idea is the one which will be adopted by the Departmental Committee, the schemes might be matured during the passing of the next few generations of electricity consumers, and when the members of the present Departmental Committee are not here to care much about what happens. Where there are undertakings established, and heavy capital already involved, there cannot be reorganization and co-ordination in a brief space of time. But that the Government Departments are not of opinion that any immediate revolution is going to take place is seen by the fact that, despite Treasury restrictions, some goodly slices of loan sanction are being handed out where war necessity compels; and that municipal bodies do not contemplate any immediate interference with their independent action is clearly to be perceived by the many schemes of plant extension which are in course of preparation.

Overheating of Cables and Gas Generation.

There have been lately numerous small underground explosions causing some inconvenience to neighbouring users of electricity, as well as disturbing free locomotion on pathways. The capacity of electric cables for acting as gas generators by overheating, and eventually causing an explosion without any external aid, has been proved by some disastrous occurrences. It is a serious subject for the electricity industry; but the "comic man" of the "Electrician" finds it suitable for one of his pallid jokes. Alluding to the fact that, according to a press report, following several loud explosions, about 100 ft. of pavement became displaced through the fusing of an electric cable igniting a quantity of gas which had accumulated under the footway, he says: "This, of course, is the perfectly proper method of showing that vigorous co-operation between gas and electric interests is now taking place." From another part of the same issue of our contemporary it is learned that a circular-letter has been sent out by the Incorporated Municipal Electrical Association, covering a communication from the Secretary of the Institution of Electrical Engineers. This refers to proposed research into the heating of underground electric cables—pointing out that the results will serve as a guide to every electrical undertaking in future in deciding the limits to which underground cables can with safety be loaded, and suggesting that each municipal electric supply undertaking should subscribe a sum of from a guinea to five guineas, according to the size of the undertaking, towards the current expenditure. The subject is also at the present time being brought before the American Institute of Electrical Engineers by Mr. J. L. Harper. In analyzing the causes of cable failure, he draws the conclusion that overheating is the most important for consideration. He suggests that the dissipation of heat by water be applied to new and permanent construction, and that, in places where such construction is possible, conduit systems should be built so that the ducts can be flooded with water, and cables operated under practically submarine conditions. Bare copper wires in aerial transmission lines now carry approximately twice the current that is carried in the corresponding conductor of an underground paper-insulated cable; and, if the lead sheath of the cables were kept at a temperature below 60° C., by the presence of water, the carrying capacities of underground cables could be made nearly to approach that of bare aerial conductors. The rapid and definite dissipation of the heat from the cables with water immediately surrounding them would not only greatly increase the carrying capacity of any particular cable, or of a particular conduit system, but would decrease possibilities of cable trouble from all other causes except mechanical injuries of the lead sheath. This is Mr. Harper's view. No doubt it will receive all due consideration by the investigators in this country.

AMERICAN GAS INSTITUTE "TRANSACTIONS."

Two substantial volumes are filled by the official report, edited by the Publication Committee, of the proceedings of the American Gas Institute at the eleventh annual meeting, which was held in Chicago last October. The first of the volumes has for a frontispiece an excellent portrait of the past year's President, Mr. William F. M'Kay, of Boston—who is now succeeded in the chair by Mr. Alfred E. Forstall, of New York. The work of Secretary and Treasurer, it is noted, remains in the capable hands of Mr. George G. Ramsdell, of New York.

As is stated on another page of this issue, vital national affairs have determined the Institute to postpone indefinitely the holding of the next regular annual meeting, which had been fixed for next October, at Washington; and this probably means the suspension of much of the normal work until the conclusion of the war. At the same time, it was at once recognized that new situations create fresh needs; and arrangements were promply made for a meeting last month for the discussion of the conditions and problems arising from the state of war. Pressing Committee work is also to be continued. It is, however, with a normal year's work we are just now concerned; and for this it must be admitted that the 1400 pages of print and illustrations (with the addition of a number of plates), of which the two volumes consist, make a very good showing indeed. Of the papers and reports themselves, it is unnecessary—seeing that they were noticed in the "JOURNAL" as soon as possible after the meeting—to say anything more than that they deal with many matters appealing to the manufacturing and the selling sides of the industry.

SCIENCE AND INDUSTRY.

Research in the United States.

PRIMARILY to record the author's observations during a recent visit to the United States, and secondly to afford material for the consideration of the position of the United Kingdom in respect of research, there has been published the first of a series of pamphlets which the Advisory Council for Scientific and Industrial Research intend issuing. It is by Mr. A. P. M. Fleming, on "Industrial Research in the United States," and is published by H.M. Stationery Office, at the price of 1s. net, or 1s. 3d. post free.

A glance through the profusely illustrated pages of this booklet convinces one that the author has done his work thoroughly; and the trend of development in the United States should have a bearing on our own national problem. The industrial research laboratories described are classified under manufacturing corporations, associations of manufacturers, universities and colleges, national institutions, commercial laboratories, and scientific societies. As to the first class, it is shown that the most striking features of the research work undertaken by companies are: (1) The installation in many cases of full-scale manufacturing facilities, which, on the one hand, enable processes to be perfected and the works to be relieved of the hampering effects of experimental developments; and, on the other hand, give the laboratory staff some elementary practical introduction to the complexities of actual manufacture, as contrasted with the relative simplicity of laboratory preparation. (2) The provision of manufacturing facilities in the laboratory, in order to develop such products as result from new discoveries to the point at which the scale of manufacture calls for transfer to one of the works departments, or to a new and separate organization. (3) The growing tendency to devote more of the resources of the laboratories to pure science investigations, with a view to making discoveries.

The freedom with which results in pure science are published is commented upon, as well as the growing appreciation in the factory of the commercial value of scientific men, and the recognition of the usefulness of research laboratories as a means of inspiring confidence in the minds of customers. It is noted that there are a number of associations of manufacturers who undertake research work for the benefit of their members—in laboratories connected with individual manufacturers, in universities, or at the Bureau of Standards.

Emphasis is laid on the value of the results of organized research as a factor in the struggle for world markets; and it is urged that the research facilities are in this country as yet disproportionate to the need—there being an urgent call for the establishment of an organization which shall maintain the creative impulse given by the war. Coming to the practical application of the lessons contained in the booklet, the author suggests that the most important alternative schemes for the United Kingdom are: Research laboratories in industrial works; research laboratories for a group of works in the same industry; centralization of research in the universities or colleges; and an Imperial centralized laboratory for the whole of industry.

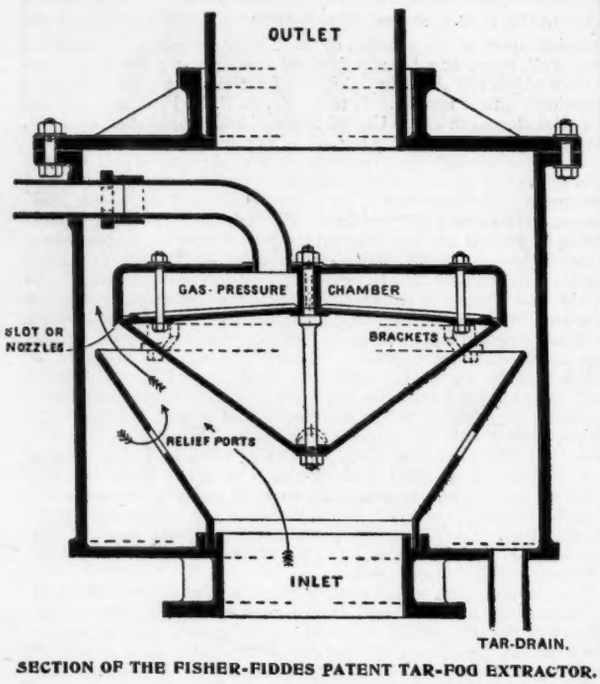
Gas from Wood, Peat, and Lignite.—In publishing in our issue of June 19 last (p. 578) a translation of the papers on this subject read before the one-day congress of the Société Technique du Gaz, we were unable to state the name of the author—the advance proofs sent from Paris not making mention of the origin of the communication. We learn that the author was M. Laurain, of the chemical staff of the Paris Gas Company.

THE ELIMINATION OF TAR FOG.

The Fisher-Fiddes Patent Extractor.

THE removal of tar fog from coal gas as soon as possible after it has left the hydraulic main has for a long time been considered desirable, both on account of preventing the absorption of the hydrocarbon constituents of the gas, and also as a starting-point for various methods of overcoming naphthalene troubles. Up to the present it has been very difficult to effectively remove this tar fog before condensation, as the temperature is usually too high for the Livesey type of washer, and those of the P. & A. type quickly block-up and become inefficient. In small works tar removal has frequently been done in a haphazard way, which is very unsatisfactory, particularly where oil-washing is being installed.

Mr. Randall, of the Yorktown and Blackwater Gas Company, at the last meeting of the Eastern Counties' Gas Association, mentioned a simple apparatus devised by Mr. Fisher and Mr. Fiddes, of Tottenham; and we now have pleasure in publishing a diagram and description of what they hope to make the standard design. The apparatus was originally designed—but in a different form—for the removal of dust from the producer gas required for heating the vertical retorts of the new section at Tottenham, of which we recently published a description; but, with slight modification, it has been found very effective for the removal of tar fog both from coal gas and carburetted water gas. The idea is to pass the main stream of gas through a rapidly moving jet or film of clean gas, or through more than one set of jets or films if necessary, whereby in the case of dust the particles are deflected sufficiently to enter an aperture leading into a dust chamber, or, in the case of tar, are made to impinge at a suitable angle against a plate from which it collects in a tar-receiving chamber. The gas used for the clearing passes with the particles of dust or fog into the chamber, and returns to the main stream through relief ports which may be fitted with valves.



SECTION OF THE FISHER-FIDDES PATENT TAR-FOG EXTRACTOR.

The illustration shows the apparatus in circular vertical form. The gas enters at the bottom, and passes up a cone-shaped pipe so as to reduce its velocity as much as possible. At the top, it meets a film of gas issuing at high velocity from a narrow slot round the circumference of a pressure chamber. The tar particles are deflected against the side of the main vessel at an angle of about 45°; and the tar quickly forms a film which still better arrests further particles. The tar trickles down to the bottom, and passes away through the tar-drain to a seal-pot, while the clean gas flows forward to the outlet at the top or side as may be convenient. The best position for the apparatus is before the exhausters, as the main stream of gas is then at a diminished pressure, while a connection from the outlet of the exhauster to the pressure chamber will, in nearly all instances, provide ample pressure for the cross current to do its work effectively.

At Blackwater, Mr. Randall finds one of these machines—made up in very homely fashion—very effective for dealing with coal gas. At Tottenham, two P. & A. machines, each for two million cubic feet per diem, have been altered to an arragement similar to that illustrated, and are removing much more tar and condensation from the gas than was the case when they worked as P. & A. machines with double belts and with a pressure difference of 4½ inches.

For these fair-size machines, with 20-inch connections, a 3-inch pressure-pipe is found sufficient. The inlet pressure to the exhausters is about 3 in., and the outlet pressure about 20 in.; but this is reduced in the pressure chamber to about 12 in. There is no back-pressure thrown by the apparatus.

The following results have been obtained on test; the variations being due almost entirely to some irregularity in condensation on account of varying make and atmospheric temperature.

Test.	Gas Passed. Cubic Feet.	Extracted. Gallons.	Extracted per Million C.Ft.
A.	186,000	7	35·0 gallons
B.	750,000	22	29 0 ,,
C.	5,000,000	191	38 0 ,,
D.	3,500,000	72	20 6 ,,
E.	5,500,000	249	45·0 ,,
		Average	33·5 gallons.

The result attained by the P. & A. machines under similar conditions was:

	Gas Passed. Cubic Feet.	Extracted. Gallons.	Extracted per Million C.Ft.
Original extractors	2,590,000	12½	4·8 gallons.
The F.-F. extractor	4.775,000	92	19·3 ,,

AMERICAN TECHNICAL MEETINGS POSTPONED.

THE altered conditions brought about by the entrance of the United States into the war have led to the postponement of several important meetings of gas men.

In the first place, it has been decided that it is inadvisable to hold the regular annual meeting of the American Gas Institute, which was to have been held during October at Washington. In order, however, to afford the earliest practicable opportunity for discussion of the conditions and problems affecting the gas industry arising from the state of war, it was resolved that a special meeting of the Institute should be held in New York on June 12, and possibly the following day. When the Board of Directors decided on the postponement of the general meeting, they requested the Technical Committee to have completed as soon as possible all papers and reports on topics of vital interest in the present war emergency, for publication in the "Gas Institute News;" these papers and reports to be considered as preliminary, and final ones to be submitted at the postponed annual meeting. Meeting subsequently, the Technical Committee determined that, in accordance with this request, work should be expedited on the following reports, &c.: Report of Committee on Standard Tests; report of Committee on Carbonization; report of Committee on House Heating; report of Committee on Gas-Fuel Appliances; report of Committee on Distribution Standards; report of Committee on Chemical Tests; all papers in the Chemical Section; a paper on "Coal Carbonization;" and a paper on "Coal Production and Removal of Naphthalene." With reference to the report of the Committee on Refractory Materials, it was resolved—"That the Refractory Materials Committee be requested to apply their efforts towards a report which will be of assistance, in view of the increasing shortage of refractory materials heretofore commonly used, by suggesting some of the new materials now being manufactured and the sources thereof, and describing their qualities." Work on all other papers and reports is to be continued, for presentation at the postponed meeting of the Institute.

For the same reason, the National Commercial Gas Association of America have postponed until a time to be later determined the annual convention which was to have taken place at Detroit during next November.

In line with others, the Iowa District Gas Association indefinitely postponed the convention called for last May.

Annual General Meeting of the German Association of Gas and Water Engineers.

The programme of the fifty-eighth general meeting of this Association, which was to have been held on June 22 at the Institution of German Engineers in Berlin, included the following items: Inaugural Address of the President, Herr M. Hase, the Manager of the Gas, Electricity, and Water Works of Lubeck; and a communication by him on the "Position of Gas and Water Works in War Time." A general discussion of this communication was to take place, in which, for convenience, the ground covered was to be divided into five sections, taken in order as follows: (1) Coal supply, the effect of the coal-tax on the position of the gas industry, and coal storage; (2) the handling of bye-products; (3) heating questions; (4) general gas-works topics, electro-motors free from danger of causing explosions; and (5) general water-works topics. The meeting also was to receive the annual report of the Council, the accounts for the year, and the reports of the Technical Committees appointed by the Association. The proceedings were to be restricted to one day, and every kind of festivity was to be omitted. This year's Vice-Presidents of the Association are Herr R. Terhaerst, the Manager of the Nuremberg Corporation Gas-Works, and Herr E. Körting, General Manager of the "Gas Company, Berlin." Prof. Dr. H. Bunte is again acting as General Secretary of the Association, in place of his son, Dr. K. Bunte, who is on active service.

A BOILING-RING WITH AUTOMATIC GAS-TAP.

[From a Dutch Correspondent.]

The heating of water by means of a kettle on a boiling-ring often entails some waste of gas; for it is a custom of the kitchen to leave a steaming kettle over the fire. To avoid any possibility of this waste, automatic means are necessary; but there is a big difference between a thermostat as used in the laboratory or in industry and an automatic arrangement suitable for kitchen purposes.

A Belgian inventor, M. Bennik, formerly of Brussels and now in Holland, has designed an apparatus, which seems to have a promising future. The boiling-ring is provided with a double burner, for two gas-taps, one for the large burner-ring and another for the smaller one. The tap for the larger one is connected with a lever running along the underside of the boiling-ring. This lever, in its turn, is connected with a vertical rod passing through an upright tube, and having on its upper end an inclined tube as shown in the illustration. In the upright tube there is a spring

acting on the vertical rod. The upper end of this rod supports an inclined tube, moving in a socket round the rigid vertical tube. Inside the inclined tube is a rod of metallic alloy of high expansive capacity, which rod is connected firmly to the lower end of the inclined tube, but acts at its other end on a small lever governing in its turn a series of pins on the vertical tube. These pins keep the spring out of action, and retain the inclined tube in its place.

The kettle is provided with a lid having a hole in the upper part, so that when it is in its position on the boiling-ring, and the inclined tube has been placed over the hole, the hot steam must pass through the tube, thus heating the expansion rod. Directly the water reaches boiling-point, and a jet of steam passes through the hole in the lid into the inclined tube, the expansion of the rod becomes extensive enough to push forward the small lever, which in its turn puts aside the movable one of the pair of stop-pins. In this way, the restraining action on the spring is removed, and the spring forces the inclined tube and vertical rod to partly revolve. This turning of the rod causes a movement of the lever connected with the burner-tap, which is thus turned off, so that the gas supply is discontinued.

The action of the steam on the expansion rod in the inclined tube in this manner causes the turning-off of the larger burner, while the smaller burner remains in action. The water is therefore kept boiling, but with a considerably lower gas consumption. The automatic arrangement comes into action almost immediately the water reaches boiling-point.

NITRIC ACID FROM COAL GAS.

Some particulars are given in the current issue of "The Times Engineering Supplement" regarding a process evolved by Prof. Häusser for the manufacture of nitric acid direct from coal or similar gases by explosion—a trial plant for which, on a fairly large scale, was known to be in operation at the Nuremberg Gas-Works before the war.

The explosion of the gas is effected in steel vessels surrounded by a water-jacket, to which, in the original plant, air and gas were admitted under pressure through separate valves. Ignition of the charge then takes place by means of a high-tension spark derived from a magneto attached to one side of the vessel. The magneto is connected with, and driven from, the same mechanism as operates the valves.

The chemical reactions involved in the process are of a particularly simple nature. The nitrogen combines with oxygen to form nitric oxide: $N_2 + O_2 = 2NO$. The nitric oxide mixtures are then cooled and passed into a gasholder, where the necessary time is allowed for oxidation to take place on the following lines: $2NO + O_2 = 2NO_2$. The nitrogen peroxide formed by oxidation is finally sent forward to counter-absorption vessels, where, reacting with water, it gives rise to the formation of a mixture of nitric and nitrous acid as follows: $2NO_2 + H_2O = HNO_3 + HNO_2$. The nitrous acid is then oxidized to nitric acid by an excess of oxygen. In this way, the acid obtained varies in strength from 30 to 50 p.ct., and the weak product is in most cases evaporated and re-distilled in order to provide a concentrated solution. The waste gases from the plant, still containing some nitric oxide, are treated in special washing towers, in order to recover the greatest possible quantity of the nitrous products. Generally from 2 to 3 p.ct. of the original nitric oxide gas is discharged with the waste products.

It is explained by our contemporary that, so far as can be ascertained, the original plant has now been considerably modified, particularly as concerns the explosion chamber; and the efficiency of the latest apparatus is such that expectations have been surpassed. In its new form, the plant consists of a battery of chambers or bombs, all of which are supplied from two compressors; while, instead of the gas and air being compressed together, the two are dealt with separately. It is essential that a high temperature should be attained during explosion; and to this end the air, after compression, is passed through a specially designed pre-heater operated by gas. For reasons of temperature, again, a small proportion of pure oxygen is regularly mixed with the air in the compressor. The latest form of container is fitted with four valves, driven by gearing from an electric motor; and it is the speed of this motor which determines the number of explosions per minute. It is essential that rapid cooling of the waste products should be effected, otherwise there is a tendency for the nitric oxide to undergo decomposition; and a special exhaust-valve is employed for the purpose of temperature drop. Immediately on the outlet of the bomb is attached a condenser coil submerged in water; and in this coil the water resulting from combustion is thrown down and drawn off. It is customary to regulate the explosions so that they occur in each bomb at the rate of about sixty per minute. Within limits, the greater the capacity of the bomb the larger will be the yield per unit of gas.

The process is applicable to producer and all low-grade gases; and so far as the yield of nitric acid is concerned, it has been shown that, when employing coke-oven gas, about 6½ lbs. of acid per 1000 c.ft. of gas exploded must be looked upon as a maximum.

AUTOMATIC TEMPERATURE CONTROL IN DEBENZOLIZING OIL.

In a communication to the American "Gas Age," Mr. P. M'Donald Biddison insists on the importance of delicate temperature control in steam stills and condensers, as used in connection with gasoline absorption plants, and remarks that the process used for extracting gasoline from natural gas is similar to that applied for the extraction of benzol and toluol from artificial gas, with the exception that the treatment of the first is carried out under high pressures—sometimes as much as 300 lbs. per square inch—while with the second absorption takes place near atmospheric pressure. In either case, it is merely a matter of washing the gas with a suitable absorbent oil; the gas being passed upwards through vertical towers or scrubbers packed with porous material, and meeting a downward flow of oil that carries with it the heavier hydrocarbon content of the gas. The saturated oil is sent to a steam-still for the separation of the dissolved matters, and can be used again.

Two illustrations of common forms of stills and condensers are given, comprising rectangular stills surmounted by stone towers packed with porous material, and the usual arrangement for separating and returning to the still any absorbent that may be mechanically carried over. The incoming oil is admitted at the top of the tower, where the vapours also pass off; so that it acts as a dephlegmator. Waste exhaust steam is delivered to the still and distributed through perforated pipes, and if necessary is augmented with live steam. The supply of the latter is governed by a 2-in. "Sarco" thermostatic valve, in order to maintain an even temperature in the still. If the apparatus is small as compared with the required work, a high still pressure may be necessary; but if it is of sufficient size, the heat and partial vacuum effect caused by the presence of steam will drive off the light oils from the absorbent at 210° to 213° Fahr. As the end point is 290° to 300°, it is evident that the partial vacuum is important, and that the vaporization of the heaviest fractions, at a temperature considerably below their boiling-point, requires the presence of uncondensed steam.

Excess of steam means not only waste of water and fuel, but the carrying over of considerable quantities of absorbent, even if the initial boiling-point is well over 350°; and shortage of steam means incomplete abstraction, leading to diminished absorbing power, and a deficient gasoline yield. Hence the importance of accurate temperature control, which must in the first place be determined by experiment on each apparatus used. Variations of 2° either way may have a marked effect on the results, as it is evident that hand-regulation of valves is not sufficiently sensitive

and fluctuations in the supply of exhaust steam, due to changes in the speed of machinery, cannot be corrected until after they are evident at the thermometer. A temperature of 180° to 190° in the separation pot will condense all the absorbent carried over, together with most of the steam; and excess at this point means the loss of absorbent by passing forward with the condensible portions. Lower temperature means premature condensation of gasoline, and its return to the still. The water supply for cooling the auxiliary condenser and the separating pot is controlled by a thermostat similar to that used on the still.

The fact that the saturated absorbent contains only 3 p.ct. of gasoline, illustrates the need for very close temperature regulation, and with the arrangement described uniform and constant results have obtained over six months' working.

Communications to the Coal Controller.

Mr. Thomas Glover, who is advising the Coal Controller on technical questions affecting the gas industry, asks us to state that all communications on questions of supplies, &c., should be addressed to the Controller. This may save delay in getting replies to letters, as Mr. Glover is not likely to be in attendance at the Board of Trade quite so constantly as he has been during the past eight weeks.

Presentation to Mr. F. R. Smith.

An interesting gathering took place at the Cottage Lane Works of Messrs. W. Parkinson & Co., on Friday evening last, when Mr. W. W. Parkinson, on behalf of the staff and employees, presented Mr. F. R. Smith with an engraved silver rose bowl, and a silver fitted toilet case for Mrs. Smith. In making the presentations, after referring to the long and valued service Mr. Smith had rendered to the firm, extending over a period of forty-five years, Mr. Parkinson said he was glad to state that, while relinquishing the active management at Cottage Lane, Mr. Smith was continuing his connection with the Company—retaining his seat on the Board, and rendering assistance in various ways. Mr. Green, the Shop Secretary, also spoke on behalf of the workmen, and referred to the many kindly and sympathetic actions Mr. Smith had shown during his long term of office, and of the excellent spirit that existed at Cottage Lane works between the men and the management. Mr. Smith, in cordially acknowledging the handsome presents on behalf of his wife and himself, referred also to the good name that the works had enjoyed throughout the trade; and he expressed the hope that the bond of union between employers and employed would be still further strengthened. He looked forward to the day when the conclusion of peace would bring with it the larger blessing of a mutual and permaneut agreement between Capital and Labour, and so make the world a brighter and better place to live in.

Estimation of Toluene and Benzene in Coal-Tar Oils.

In the current issue of the "Journal of the Society of Chemical Industry" appears an abstract of a paper, by Mr. G. Harker, in the "Journal of the Royal Society of New South Wales." It is pointed out that in estimating toluene and benzene in coal-tar oil it is usual to subject the tar oil to a preliminary distillation to 150° or 170° C., followed by a washing of the distillate with sulphuric acid and caustic soda. The washed product is then distilled under conditions varying considerably. From the volume of the fraction collected between certain temperatures and by reference to tables, the compositon may be deduced. But the range of such tables is limited; and occasionally pure benzene, toluene, or xylene must be added before distillation. The author carried out a series of experiments with pure benzene, toluene, and xylene. A Young and Thomas still-head of five sections was used, and the rate of distillation was kept at one drop per second. When mixtures of benzene and toluene in the proportion of 3 : 1 or 4 : 1 were distilled, the volume distilling-over up to 90° C. represented the volume of benzene present. With mixtures of 50 c.c. of benzene and 50 c.c. of toluene, the first 50 c.c. came over slightly above 95° C. Additions of xylene necessitated a still higher temperature. The actual content of benzene and toluene in the samples was obtained by carrying out a blank-test of the sample after each distillation. In this blank-test, quantities of pure benzene, toluene, and xylene were added to the residue, in accordance with the approximate estimation. The mixture was again distilled, whereby any error in the first estimate was corrected. After a preliminary distillation up to 170° C., the distillate was washed with sulphuric acid and caustic soda. The washed oil was then distilled, and a blank-test carried out as described. The paraffins present were estimated by a sulphonation test with anhydrous sulphuric acid. Details of tests on three samples of coal-tar oil, sp. gr. ·928, ·98, and 1·012 respectively, were given in the original.

Sir John Ramsden has given £3000 to the Huddersfield Technical College Extension Fund, conditionally on £2000 of it being devoted to the Coal Tar Colour Chemistry Department, and the other £1000 to the Engineering Department.

"ABRUPT" CONDENSATION OF NAPHTHALENE.

Dutch Experience of the Deville Process.

The experience of Heer Grandpré Molieri, of the Gouda works, in seeking to remedy the occurrence of naphthalene deposits in works and town mains in accordance with the Paris Gas Company's system, is the subject of a recent communication to "Het Gas," translated in the current issue of the "Journal des Usines à Gaz," whence the following translation is made. Our French contemperary adds a note pointing out that the chief cause of the difficulties experienced in the first attempts at Gouda arose from the fact that the cooling installation was placed too far from the retort-bench, with the result that its action was exerted upon the gas when the latter had lost too large a proportion of its tar. It considers the success achieved by Heer Molieri very satisfactory in view of the considerable unavoidable departure from the practice which for some years past has been that of the Paris Gas Company. It will be remembered that this practice—the outcome of the researches of M. St. Claire Deville—was the subject of a paper by M. Laurain read before the 1911 Congress of the Société Technique, a translation of which passed into our pages at the time.*

Numerous obstructions due to naphthalene in both the works and town mains prompted recourse to the Deville process of "abrupt" condensation—an alternative which was adopted owing to the practical impossibility of constructing a naphthalene washer for use with heavy tar oils. A scrubber which was available in the works was converted for this purpose into a tubular "refrigerator," a Livesey tar-separator was utilized, while a small pump completed the installation. The dimensions of the different parts of the cooler used were as follows: Diameter, 1·22 m. (4 ft.); height, 9·5 m. (31 ft.); number of tubes, 88; diameter of tubes, 64 to 70 mm. (2½ to 2¾ in.); cooling surface, 165 sq. m. (1780 sq. ft.). The Livesey tar-separator had a capacity of 10,000 cb.m. (353,000 c.ft.), and consisted of a series of ten wrought-iron perforated plates, each of 1·25 m. (4 ft. diameter); the diameter of the holes being 10 mm. (0·4 in.). The maximum capacity of the small pump was 5 cb.m., about 1000 gallons, per hour.

The gas had its inlet at the top of the cooler, passed downwards through the tubes, and thence directly into the tar-separator, along with the condensed products. The water, providing the cooling action, was led into the base of the apparatus (inside the tubes) and passed out from the top. A large proportion of it could be usefully employed in the retort-houses for quenching the coke, &c.

This installation was put into use about the middle of August, 1912, and is still being used with satisfactory results. The gas enters the cooler at a temperature which, according to the time of year and volume of gas, varies from 100° Fahr. to 122° Fahr. This temperature is too low, and means require to be taken to raise it. At the outlet, the temperature is from 2° to 6° Fahr. higher than that of the water for a gas production of 10,000 cb.m. (353,000 c.ft.). The quantity of water used averages about 4 cb.m. (880 gallons) per hour, corresponding with a consumption of approximately 10 litres of water per cb. m. (60 gallons per 1000 c.ft.) of gas. According to M. St. Claire Deville, a quantity of 2 to 3 litres per cubic metre of gas (12 to 20 gallons per 1000 c.ft.) is sufficient where the cooling surface is 16 to 18 sq.m. for a make of 1000 cb.m. (5 to 5½ sq.ft. per 1000 c.ft.).

The temperature of the water (drawn from a neighbouring canal) undergoes very considerable variations of temperature, according to the time of year—ranging from 32° to 72° Fahr. During the summer months especially, condensation is assisted by a low temperature. The crude gas, emerging from the tubular condenser at a low temperature, still retains a large quantity of tar fog, proving that the condenser does comparatively little in the way of separating tar. The gas remains in the condenser for a very short time—about a minute in the case of a make of 10,000 cb.m. According to M. St. Claire Deville, treatment of the gas made for about a minute at a temperature of 122° Fahr. brings about the separation of from 7 to 8 p.ct. of its tar in a condition of density almost equal to that of tar from the hydraulic main. The percentage would be greater in the case of the particular condenser used, but the total quantity of tar to be condensed is not a matter of great importance. The tar in the state of fog, after cooling, is separated from the gas by the Livesey washer just as tar in its normal condition.

Condensed ammonia liquor passes likewise through the Livesey washer, and is found to have a density of about 6° Beaumé, showing that a large quantity of ammonia is dissolved in the water. The "Standard" washers have therefore much less ammonia to extract, and thus can do with a relatively small quantity of water. The ammonia liquor in the tar cisterns proves to be of greater strength than that obtained by other methods of condensation, varying between 3·3° and 4·2° Beaumé—equivalent to 22 to 26·5 grammes of ammonia per litre. This is an additional advantage of the system which may well be taken into account.

The Livesey tar-separator was installed at the start, so as to condense all the tar vapour of which the installation was capable. As against English gas coals, the use of which gave some trouble, the German coals presented no difficulty. Despite ample lubrication of the extractors by means of the oils, the temperature of the

* See "Journal," Vol. CXIV., p. 602.

gas rose from 54° to 59° Fahr., giving rise to certain phenomena as follows.

A deposit of pitch, very thick and difficult to remove, formed at the inlet and outlet of the extractor and in the return governor. The same was the case in the Pelouze washer. The gas, having risen in temperature, re-dissolved all the volatile hydrocarbons which had condensed from it. At irregular intervals the extractor would stop working without it being possible to say when the stoppage was going to occur, and without there being any means of getting it going again.

A partial remedy for these troubles was found in re-passing the gas from the return governor, not into the inlet mains of the extractors, but into those of the tubular cooler, so as to produce a fresh reduction of temperature. Nevertheless, at odd times stoppage of the extractor still took place as a result of the different coals employed; and operations were thus extremely uncertain. The Livesey tar-separator was then abandoned, and the attempt made to use the large works' condenser as a tar-separator. The extractors then worked regularly, and enough tar was deposited to serve as a lubricant of the gas. Deposition of thick tar took place in the large condenser, going to prove that the latter was unequal to its work only as regards its use for the separation of the tar.

The Livesey tar-separator was then re-installed (April, 1915); but so arranged that the cooled gas was washed with water instead of tar, as could be done owing to the existence in the gas of some slight tar fog—sufficient to ensure the regular working of the extractors even when English gas coal exclusively was being used. The temperature of the gas then rose from 43° to 50° Fahr. in the extractors. The Pelouze again worked regularly; attention to the bells being very seldom required. The tar from the Livesey washer was very fluid, both in summer and winter, and independently of the kind of coal distilled.

In the use of English coals a deposit of thick tar was found to take place at the inlet of the tubular condenser. These deposits gave no cause for anxiety, since it was easy to disperse them by putting the condenser out of action and passing steam through it. Within two days the condenser was completely cleaned and ready for use again. The cause of these deposits should probably be attributed to the low temperature of the gas at its inlet. The somewhat great distance which the gas requires to traverse before reaching the condenser causes it to lose a large part of its tar—a fact which is distinctly unfavourable to successful working. But, unfortunately, the available plant could not be used in any other way. In the circumstances, the result exceeded expectations.

Following the re-building of retort-benches during the summer of 1915, the tubular condenser was out of use for some months, and it was thus necessary to fall back upon the previous method —namely, that of the large works' condenser and six annular condensers. The compulsory use of English coal of very doubtful quality caused almost daily stoppage of work as the result of deposition of tar in the atmospheric condensers, the syphons, and other parts of the plant.

Not a single further obstruction was caused on installing the tubular condenser with the Livesey separator. Also no difference worthy of mention could be discovered in either the calorific or the lighting power of the cooled gas when treated according to the earlier method or by that of M. Deville.

The gas obtained on this system is not entirely free from naphthalene; but the quantity still remaining is no longer a source of danger. Some years previously, it was impossible to tap a single town main without discovering naphthalene in large quantity. At the present time this trouble is very rarely encountered. The improvement is the more remarkable from the fact that the system of town mains is an exceedingly poor one, particularly as regards the placing of the mains, which are largely only 8 in. below the roadway and 16 in. and deeper in other parts. The least change of temperature thus has its definite effect upon the gas.

In the course of last March, an examination was made of mains of 16-in. diameter connecting the new parts of the system laid down in 1913 with an existing gasholder of 4750 cb.m. (167,000 c.ft.) capacity and another of 10,000 cb.m. (353,000 c.ft.) constructed during the same year. Most of these mains were in a part of the system which had been in uninterrupted use for 2½ years. In the case of the 10,000 cb.m. gasholder, there was a very small deposit of naphthalene in the syphon at the inlet and none at all at the outlet. In the case of the smaller holder, the naphthalene deposit at the inlet syphons was slightly greater. At the outlet, both the syphons and the vertical portions showed a notable deposit of naphthalene. In regard to the latter case, it is to be noted that this main connects the existing gasholder with the town governor. The holder, which had been in use since 1900, had not been examined since this time, and there had been no removal of naphthalene deposits produced in it. Moreover, the inlet and outlet mains could not be thoroughly cleaned before taking the new mains into use. It may thus be concluded that notable quantities of naphthalene were deposited at the inlet and outlet of the holder from the fact that, on taking down the inlet and outlet mains, naphthalene was removed literally by the cartload. It would thus appear that the naphthalene was formed there by displacement, particularly as it was observed that certain parts of the deposit were older than others. The details which have been given will, it is hoped, supply an interesting review of the results obtained over several years by "abrupt" condensation.

PAPER GAS-PIPES.

The current "Journal of the Society of Chemical Industry" contains an abstract of a report by M. Rudeloff, of the German Imperial Institute, on the testing of materials for tubes, prepared according to the process of A. Von Valois.

The tubes are made by rolling paper to the desired diameter and thickness of wall, fastening with a suitable adhesive, and applying a protective coating. They are intended to serve as pipes for gas and water. According to calculation, the specific resistance to direct hydraulic bursting pressure is 360 kilos. per sq.cm. (5120 lbs. per sq.in.). It is stated that the tubes were not appreciably affected by the prolonged action of coal gas. Some which stood full of water for several weeks showed no perceptible swelling or loss of resistance. The pipes are only one-sixth to one-tenth the weight of lead pipes, and are found to resist three to four times the pressure for equal diameters. The weak point of the paper pipes appears to be the junctions, which consist of tube sections slipped over the two ends to be joined—the annular space being packed with some suitable composition. The jointed pipes burst at a considerably lower pressure than the single pipes, and in some cases gave way at the joints.

Tests for resistance to external pressure showed an average of 27·8 atmospheres, which is regarded as sufficient resistance for the pressure of the earth, provided the material does not become softened in course of time.

A further set of trials was made with "Pertinax" tubes, made from paper impregnated with synthetic resin, and rolled under tension. The smallest internal diameter obtainable is 5 mm. (0·2 in.). The tests have not established the suitability of paper tubes for use with water, nor for constructional work, owing to the low compression strength of the tubes (4·6 kilos. per sq.cm. = 65 lbs. per sq.in.). The summary does not contain particulars of tests of any prolonged action of moisture on the tubes, which, as regards their suitability for gas-mains laid in the ground, would appear to be a chief factor.

PROGRESS OF CHEMISTRY AND GAS ANALYSIS.

In the course of an article in the "Chemical Trade Journal" on the progress of analytical chemistry, abstracted from the Chemical Society's "Annual Reports on the Progress of Chemistry for 1916," by Mr. C. A. Mitchell, F.I.C., the following is included among the remarks under the heading of gas analysis.

Attention has been directed to a source of error in the analysis of generator gas through incomplete absorption of the carbon monoxide by ammoniacal cuprous chloride, and the combustion method is therefore more trustworthy for the estimation of hydrogen, methane, and carbon monoxide in such gases. The method of fractional combustion with copper oxide has been shown to yield accurate results with gaseous mixtures of all kinds. The most suitable temperature for the combustion is 275° to 300°.

As direct methods, when practicable, are more satisfactory than indirect methods, a new process of estimating carbon monoxide in the presence of unsaturated hydrocarbons seems worthy of thorough investigation. It is based on the fact that when a gaseous mixture is repeatedly passed through a tube charged with soda-lime (containing about 20 p.ct. of sodium hydroxide) heated to 230°, any carbon monoxide present is absorbed and retained by the soda-lime. Obviously, the gas must first be freed from carbon dioxide and oxygen by being passed through absorption pipettes charged with the usual reagents. The method appears to be capable of general application, and, should further investigation confirm its trustworthiness, it should find a permanent place in schemes for the analysis of gases.

A rapid and accurate process for estimating sulphur in small quantities of coal gas has been based on its oxidation by combustion with an excess of air in a quartz tube containing platinum in the form of gauze and wire fabric. The most efficient reagent for absorbing sulphur compounds in gas is phenylhydrazine. The combustion test in the presence of porous platinum may also be used for the detection of sulphur in 10 c.c. of gas.

Calorific Standard Application and Order.—The Board of Trade have received an application for a calorific standard of 500 B.Th.U. from the Heckmondwike and Liversedge Gas Company. The Board have made the Order asked for by the Northampton Gas Light Company.

Toluene from Water Gas.—An investigation has been conducted by Mr. E. J. Hoffman, on behalf of the United States Bureau of Mines, with the object of ascertaining whether there was any justification for the prevalent prejudice that toluene from water gas was unsuitable for nitration, because it contained some hydrocarbons of the aliphatic series, the removal of which could not be effected by the usual methods of purification. The experiments early showed that, if the sample of water-gas toluene under investigation contained any aliphatic hydrocarbons, they were present in negligible quantity, so far as affecting nitration was concerned. As a matter of fact, he found that the impurities did not amount to 1 p.ct.; and so the nitration proceeded as with ordinary toluene.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

Price of Gas at Doncaster.

SIR,—I note that there is a slip in the "JOURNAL" for this week; some reference being made to an alteration in the price of gas, under the name of Doncaster.

The particulars given do not refer to this town.

Gas-Works, Doncaster, June 29, 1917. ROBT. WATSON.

[The paragraph alluded to was received from a South Yorkshire correspondent, who in his copy several times mentioned the name "Doncaster." He is being communicated with; but until his reply comes to hand, it is impossible to say to what town the particulars do refer.—ED. G. J.]

The Adulteration of Gas Coal.

SIR,—The article in your issue of June 19 is at once opportune and to the point; while the figures constitute a potent indictment of the myopic policy of the department responsible.

The general depreciation in the quality of gas coals was marked immediately after the war; but the fuel now supplied is comparatively inferior from every productive standpoint. A reduced yield of 1000 c.ft. per mouthpiece represents a very serious strain on the resources of many works; and there appears every probability of restricted outputs at mid-winter being the rule rather than the exception.

Apart from the question of additional retort-power involved, there is the not less pressing problem of labour. When practically every undertaking in the country has at the moment insufficient skilled stokers to meet the winter demand (even with normal pre-war qualities of coal), the outlook is indeed far from reassuring.

From whatever view-point the matter is considered, the handling of coal containing large quantities of inert material cannot but be condemned; and all the objections which could be raised in normal times are emphasized and accentuated in the present emergency. The costs of carriage, haulage, and storage (legitimately increased owing to war conditions), are thus seriously augmented to no purpose; while valuable transit space is employed for no better end than to shift rubbish from one part of the country to another.

The operation of picking does notcall for any high degree of skill, and could be accomplished entirely by women and over-age men.

The matter is one that vitally touches the gas industry; and it is to be hoped that fuel-users generally will make strong representations to the authorities, pointing out the economic unwisdom of prevailing conditions.

June 25, 1917. "ACONCAGUA."

REGISTER OF PATENTS.

Tar Dehydration and Ammonia Distillation Plant.

No. 106,642.

BALL, F. L., of Maidstone, and HILLER, H. KING, of Victoria Street, Westminster.

No. 6974; May 16, 1916.

This form of plant can be used either for the dehydration of tar, the debenzolizing of oil, or the distillation of ammoniacal liquor, in such a way that the operations can be "effected without the danger (even when the process is forced excessively) of priming, frothing, and bumping, which . . . attaches to direct-fired stills as at present constructed."

The liquid is caused to pass into a still A in a long shallow continuous stream of predetermined depth. The still is provided with an inlet B for the raw liquid; an outlet C for the treated liquid; and a pipe D for the effluent vapours. The still contains a series of zigzag channels formed by staggered deflector plates F, of steel, standing vertically on the bottom of the still. The lower edge of the plate and the bottom surface of the still are perfectly level, "so as to form a practically tight joint, and yet be free to expand or contract without buckling or setting up strains inside." They are held in place at alternate ends of the still by double angle cleats, and are slightly deeper than the stream of liquid flowing between them—6 in. when the stream of liquid is 6 in., with a distance between the plates of 12 in. Further, to avoid priming and frothing, there is given to the liquid alternately to the horizontal flow also a vertical flow, by means of a series of hollow cast-iron heat dispersers G.

These heat dispersers (see detail) are hollow castings, with a rectangular base and vertical sides of sufficient width to completely fill the cross section between each pair of deflector plates—that is to say, if the channels are 12 in. wide the dispersers will also be 12 in. wide. There is a wide opening H in the base in the inward direction of the flow, and a small relief opening I in the outward direction. The vertical section is slightly conical, to accelerate the upward direction of the fluid; and it terminates in a narrow throat J, from which the fluid is discharged in a thin film over a slightly sloping table K. The base of these devices is of solid metal with the exception of the openings, and so they absorb heat through the bottom of the still, which is transferred to the column of tar or other liquid in them. This, owing to its heated condition, becomes of a lighter specific gravity than the upper layers within the still, and therefore rises within the heat dispersers sufficiently high to flow over the tables K.

The still is heated externally by a direct fire L, the combustion gases of which pass through flues E to the chimney M. The flues correspond to the channels within the still in such a way that, the inlet for the fluid being at one extremity of the series, and the outlet at the further extremity, the liquid is progressively heated, and therefore the volatile matters can be distilled according to their respective vapourizing temperatures. In this way, there is obtained a more gentle evolution of vapour than is possible if a large volume of liquid is heated at one time to a similar maximum temperature. The tar or oil vapours, on leaving the still by the pipe D, pass through a condenser coil in the usual way; while if the still is being used for the dissociation of ammonia, the vapour passes into an acid saturator of ordinary form.

Atmospheric Gas-Burners.—No. 106,734.

HOOKER, W., of Aldershot.

No. 12,143; Aug. 28, 1916.

This invention has for its object to construct an atmospheric gas-burner that will secure the proper mixture for combustion purposes by adjusting the valve of the gas-nipple only—the openings for air being permanent.

Hooker's Atmospheric Gas-Burners.

Three or more gas-holes are made in the nipple, in line and of varying sizes—each size, commencing at one end, increasing in diameter. Inside the nipple is a screw or sliding valve, which can be moved along from the outside to close or open one or more of the holes—the closing commencing at the end having the largest hole. In its simple form the valve consists of a round rod having one end reduced in diameter and screw-threaded for engaging a screw-threaded hole in the nipple casing. The other end projects through a hole in the nipple casing and carries a turn-button or handle. The rod is of such a diameter that it will cover all the holes in the nipple, and the screw-threaded end is of such a length that the larger diameter of the rod will uncover or cover the holes by turning it. Two forms of the burner are shown.

Thus "one style of burner can be made to suit varying qualities of gas, and the valve be then adjusted to suit the quality of the gas for a particular district; and in all cases the ordinary gas-cock can be turned full on."

Gravity Bucket Conveyors and Elevators.

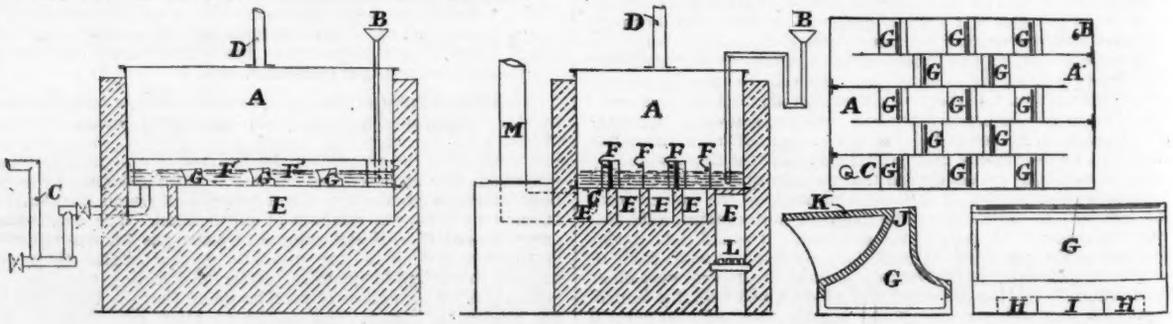
No. 106,655.

DRAKES, LTD., and DRAKE, J. W., of Ovenden, Halifax.

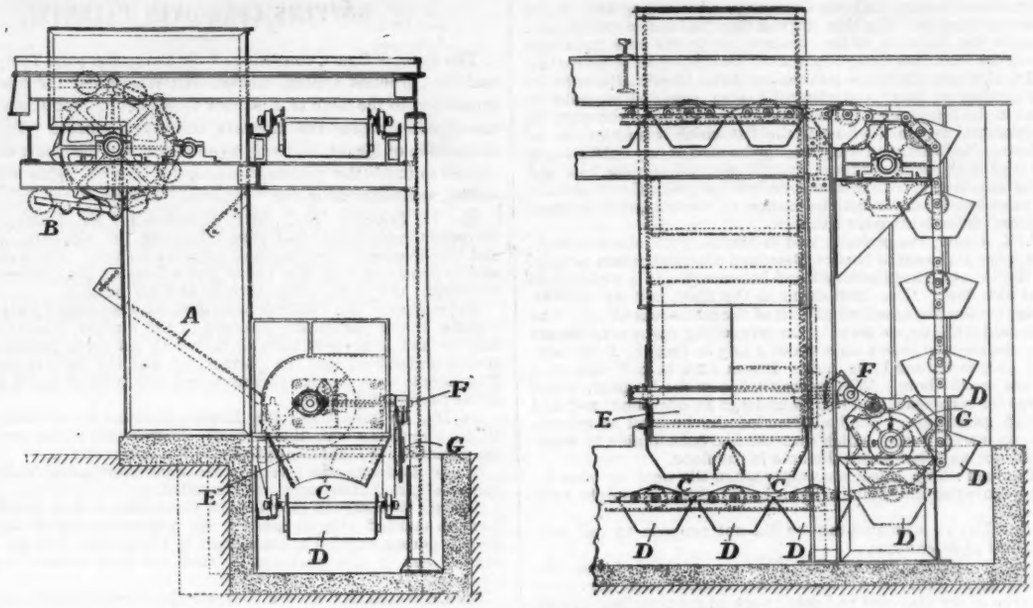
No. 7542; May 27, 1916.

This invention consists in so constructing the shoots or hoppers through which the coke has to be fed on discharge from the retorts that it is possible "with the greatest precision" to measure and deliver the desired amount to each bucket in turn without any of the coke falling away from, or being deposited outside of, the particular bucket into which it is desired to supply it.

The shoot A [see p. 25] is arranged so that any ordinary conveyor



Ball and King-Hiller's Combined Tar Dehydration and Ammonia Distilling Plant.



Drakes' Gravity Bucket Coke Conveyor and Elevator.

B (which first receives the coke from the retorts) is enabled to deposit it therein in such a manner that the shoot will deposit it in the orifices C beneath. The portion of the hopper beneath the shoot is preferably divided into two passages, so that the orifice of each will be of an area that will lie within the area of any bucket D to which it has to supply the desired quantity of coke. The length of the orifice of each shoot is slightly less than the length of the bucket, while the width of each orifice is considerably less.

Mounted to oscillate within the hopper E and above the mouthpieces C is an oscillating valve operated by having a gearing wheel or toothed quadrant to engage with a quadrant on a shaft F, which shaft has an arm also fixed upon it, so that an anti-friction bowl may be mounted to take against a cam fixed upon the shaft G that carries the sprocket wheels which form the part of the mechanism for moving the chains carrying the buckets D.

The oscillating stop-piece above referred to receives and arrests the descent of any coke that is deposited upon, and descends down, the shoot A. Thus when the apparatus is set in motion the rotating of the shaft G to bring the buckets D beneath the orifices C causes the stop-piece to cut off and transfer the exact quantity from the coke, which is conducted to it by the shoot A, necessary for filling the two buckets beneath the orifices. The continued motion of the stop-piece has the effect of depositing the coke into the hopper, where it is divided into two parts—one portion being discharged by each orifice to its respective bucket beneath. The quantity of coke thus cut off and deposited passes through the lower outlets and descends into the respective buckets beneath.

At the time that the stop-piece begins to deposit coke into the buckets, those which are to receive it will be in position with their leading edges opposite the rear edges of the mouthpieces, since the width of each bucket extends beyond the width of the mouthpiece, as the time that it takes the coke to descend its bucket is allowed for by the passage of each bucket from the position where the rear edges of the orifices are directly over the leading edges until the leading edges have moved sufficiently forward for the rear edges to be in such a position as to have received their respective quantities of coke. Notwithstanding the continual movements of the buckets, the supply of coke is carried out during the time each bucket is travelling beneath its respective mouthpiece, and is cut off immediately prior to the space between the buckets being brought beneath the mouthpieces.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official Journal" for June 27.]

Nos. 8706—9070.

ANDERSON, W.—"Process of carbonization." No. 8789.
BAGLEY, D.—"Combined still and process for debenzolizing absorbent oil and rectifying crude benzol." No. 8735.
BASSET, L. P.—"Process for the manufacture of sulphuric acid from sulphate of lime." No. 8999.
CHEMICAL ENGINEERING COMPANY.—"Separation of aniline, &c." No. 8959.
DEMPSTER & SONS, R.—"Valves for controlling, reversing, and bye-passing flow of gas through purifiers, condensers, &c." No. 8914.
EDWARDS, E. A.—"Production of incandescent light." No. 9003.
ETLINGER, G. E.—"Means for adjusting gas-lamps." No. 8814.
GEORGE, S. A. R.—"Gas-cookers." No. 8811.
HALL, W. A.—"Process of cracking high-temperature coal-tar oils." No. 8932.
HANKAR, R.—See Hall. No. 8932.
HORSFALL, J. E.—See Dempster. No. 8914.
LAUNHARDT, G.—"Gas-burner for heating baking-ovens." No. 8851.
LUMB, H.—See Dempster. No. 8914.
LYMN, A. H.—"Gas-producers, &c." No. 8924.
METERS, LTD —"Valves." No. 9056.
MILLER, J.—"Brackets for incandescent gas-mantles." No. 8732.
PEASE, E. L.—"Means for transmitting and utilizing heat." No. 9016.
POOLEY, H. J.—"Recovery of volatile solvents." No. 9005.
PRAGER, H.—See Chemical Engineering Company. No. 8959.
RAMBUSH, N. E.—Lee Lymn. No. 8924.
SCOTT & SON, G.—See Pooley. No. 9005.
SPENSLEY, J. W.—See Chemical Engineering Company. No. 8959.
TURNER, C.—"Distillation of carbonaceous material." No. 8743.
WOODHEAD, F.—"Appliance for use with gas-stoves for keeping food warm," No. 8885.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Kenilworth Gas Bill.

The Kenilworth Gas Bill was returned from the Commons agreed to with amendments. The amendments were considered, and agreed to.

HOUSE OF COMMONS.

Provisional Orders Bill.

The Gas and Water Provisional Orders Bill was read the third time, and passed.

Lisburn Provisional Order Bill.

The Provisional Order of the Local Government Board granted to the Lisburn Urban District Council, authorizing the increase of the charge for gas from 4s. to 6s. per 1000 c.ft. came before the Committee on Unopposed Bills of the House of Commons, and was passed. It was explained that the gas undertaking was taken over from a private Company by the Lisburn Council in 1909; the maximum rate being 4s. This had resulted in a charge upon the rates; and the new maximum would obviate any such charge.

LEGAL INTELLIGENCE.

LIABILITY FOR NEGLIGENCE OF WORKMEN.

HIGH COURT OF JUSTICE.—KING'S BENCH DIVISION.

Wednesday, June 27.

(*Before* Mr. JUSTICE SHEARMAN *and a* COMMON JURY.)

Kimber v. The Gas Light and Coke Company.

In this case Maude Emma Kimber sought to recover damages in respect of personal injuries sustained through stepping into a hole in the floor of a house at No. 132, Brondesbury Road, which was said to have been left unguarded by defendants' workmen. Defendants denied negligence, and said if their workmen allowed plaintiff to enter the premises they did so without authority. They also pleaded contributory negligence on the part of the plaintiff.

Mr. HOLMAN GREGORY, K.C., and Mr. ELLIS HILL appeared for the plaintiff; and Mr. THORN DRURY, K.C., and Mr. CHARLES DOUGHTY represented the defendants.

Mr. GREGORY said the house in question had been let to a Mr. Hall

by the London Electric Railway Company, who had agreed to put it into thorough repair. For this purpose they had instructed Messrs. J. G. Scott & Son, builders, of Brondesbury, to do the work; one condition being that the Gas Company should be employed to do certain work. Mr. Hall put the house into the hands of Messrs. Bates to let the upper portion as flats; and plaintiff having obtained an order to view, went to the house, knocked at the door, and showed the order to one of defendants' servants, who said the flat which was to let was on the first floor. No intimation was given by the man of any hole being in the floor; and in the semi-darkness plaintiff stepped into the hole and sustained serious injury. Counsel contended that plaintiff was lawfully upon the premises, that she had no notice of the trap, and, in these circumstances, defendants were liable.

Miss *M. E. Kimber*, the plaintiff, said in March, 1916, she was looking out for a flat and went to Messrs. Bates and obtained orders to view. She went to No. 132, Brondesbury Road between 3, and 4 o'clock and knocked at the door. Two men came to the door, and on presenting the order to view she asked which part of the house was to let. One of the men said "the upper part." On proceeding upstairs to inspect the rooms, she stepped into a hole about 2 to 3 ft. long by 6 in. wide. There was no guard round the hole. It was dark at the time, and she could not see the hole. Witness was taken to the hospital, where she was kept for six weeks, and had to undergo an operation, and had since suffered great pain. She had attended the hospital as an outpatient for six weeks, during which time she had been unable to work. The men did not warn her about the hole in the floor.

Cross-examined: The house was empty when she went to view it; it was being converted into flats. Had it been lighter, she might have seen the hole.

Mr. Thorn Drury intimated that he did not propose to call evidence on behalf of defendants.

Mr. Gregory, in summing up plaintiff's case, contended that defendants had been guilty of the clearest negligence; their servants, being in charge of the staircase and doing work on the premises, having removed a board.

Mr. Thorn Drury submitted that there had been no negligence on the part of defendants. The house was entirely unoccupied, and was in the hands of workmen, who were fitting it up for incoming tenants. Any one going into such a house could not expect to find the same state of circumstances to exist as would be found in an occupied house. Defendants had no power to admit people to the house or to prevent their entering. What was the suggested negligence? It was said that this being an unoccupied house, the workmen should not have left the hole unguarded. But it had never been the practice to erect a fence when a board was taken up. With regard to the suggestion that plaintiff was not warned, he submitted that any person viewing vacant premises must be credited with possessing a certain amount of common sense, and, accepting the definition of "negligence" as "want of care according to the circumstances," there was clearly contributory negligence on the part of the plaintiff.

His Lordship, in summing up, pointed out that it was well settled law that a person could not recover damages if he was part author to his own injuries. Even if defendants were negligent, they would not be responsible if plaintiff had not exercised reasonable care. He left four questions to the Jury, which they answered as follows:

1.—Were the Gas Company's servants negligent in failing to protect the hole?—No.

2.—Were the Gas Company, by their servants, negligent in not warning the plaintiff of the existence of the hole?—Yes.

3.—Was the plaintiff guilty of contributory negligence?—No.

4.—Damages, £275.

Mr. Holman Gregory submitted that judgment should be entered for the plaintiff on these findings. Defendants had created a source of danger, and, according to the view of the Jury, plaintiff should have been warned of it.

Mr. Thorn Drury contended that judgment should be entered for defendants, as they owed no duty to the plaintiff. There was no precedent for such an action as the present, as the point had never been directly raised or decided. There could be no negligence without duty. Defendants were on the premises under a contract with the owner to do certain work, and were not liable for any acts of ownership. The act which defendants had done was a perfectly lawful one; and the only thing which had been found against them was one of omission. He did not admit that the hole in the floor was a concealed danger.

Mr. Gregory agreed that no case had ever been decided which bore directly on the point raised; but as defendants owed a duty to a person who was lawfully on the premises, they were responsible for any damage which occurred. In support of this contention, he cited the decision of the House of Lords in *Lowery v. Walker*.

His Lordship, in giving judgment, said he had, after some hesitation, come to the conclusion that the plaintiff was entitled to succeed. It appeared that the Electric Railway Company had a house which was out of repair; they entered into a contract with Mr. Hall to let it to him, and agreed to do the repairs. A firm of builders was employed to do the work; one stipulation of the contract being that this firm should instruct the Gas Company to make the necessary alterations to the gas-fittings. The owner permitted the defendants to do the work; but that did not prevent him using the premises, or giving permission to other persons to lawfully use them. Plaintiff, having an order to view, was lawfully on the premises, though defendants' workmen had no authority to give her permission to enter. It appeared that the workmen had taken up a board, leaving a hole at the foot of the stairs. Into this hole plaintiff stepped; and she now claimed damages alleging negligence on the part of defendants' servants. It was said defendants had no part in inviting plaintiff to be on the premises; but the case rested on simple lines: The lady had a right to be there; the hole was made by defendants' servants; and therefore the proper persons to be sued were the persons whose negligence had caused the injury. The result of taking up a board was a "concealed danger," as a place was left which was dangerous in itself to anybody who walked over it. The Jury having found there was negligence in not warning the plaintiff of this danger, judgment would be entered for plaintiff for £275, with costs.

His Lordship granted a stay of execution with a view to an appeal.

KOPPERS COKE-OVEN PATENTS.

The Patents Court, consisting of the Controller (Mr. Temple Franks) and Sir Cornelius Dalton, finished last Wednesday the hearing of the opposition to the issue of a licence to Messrs. Simon-Carvès, Ltd., to manufacture under the Koppers coke-oven patents. The previous submission of Mr. H. V. Derry's contention that the Court had no jurisdiction to touch the patents, because the English rights were already vested, was reported in the "Journal" last week, pp. 628-9.

Mr. H. Terrell, K.C., M.P. (Counsel for Mr. Derry), produced correspondence which had passed between the Koppers Coke-Ovens and Bye-Products Company and Koppers himself. The Company was said to consist of Koppers, Derry, and a German (now interned) named Altenhein, and to have been formed as a partnership.

Major *Barker*, the Solicitor who drew up documents for a proposed transfer of the partnership concern to the limited liability company, said he had interviews from to time with all three partners, and he always understood that the partnership had the right in the patents. The patents were the partnership assets, and went with the remainder of the partnership assets.

By Mr. Hunter Gray (for Messrs. Simon-Carvès, Ltd.): During all his interviews with the partners, the question of the ownership of the patents never came up specifically for discussion.

Similar evidence was given by Mr. *Shuttleworth*, the Auditor to the partnership and afterwards its Controller.

Counsel then argued that for the Controller to find jurisdiction he must be satisfied that Koppers at the commencement of the war was the sole person entitled to the benefit of the patents. If the equitable interest was in the partnership, then the sole interest was not in Koppers.

The Controller: Even if they were partnership assets, would it not have been possible for Koppers to have dealt with them himself? Is it not conceivable that there may be two kinds of beneficial right in the property of a partnership?

Counsel said he thought that had there been no war, and Koppers had attempted to deal with the patents, the partnership could have restrained him.

The Controller: The real question of proprietorship seems never to have been raised. Is there not a middle course possible here—that they never intended the patents to be wholly transferred to the partnership, nor did they intend them wholly to remain in the control of Koppers? The partnership was to have control for working, and the proceeds were to be divided between Koppers and the other two. With such a practical understanding, the question of proprietorship never would arise. If the situation is open to two sorts of legal interpretation, why should we find for one rather than the other?

Mr. Terrell replied that the Court never could establish jurisdiction where it was doubtful. On the point of legal ownership, something was to be said no doubt for the Controller's point of view; but the moment that they turned to equitable ownership, jurisdiction became problematic.

The Controller: Is it not for you to demonstrate that, upon the documents submitted, something occurred which amounted to a transfer of ownership?

Mr. Terrell submitted that it was not intended the partnership should have a licence, or the licence would have been revocable. Koppers, in his letter returning the agreement, said: "The duration of our business relationship is to be unlimited—that is to say, indissoluble by any notice to terminate." There was no licence which could give to the licensor the goodwill of the business.

Mr. Gray argued that on the evidence it was plain the beneficial interest as well as the legal was in Koppers. But if it were not, and it was a partnership asset, even in those circumstances the Court had jurisdiction. Derry had said: "The patents were of no importance to us; we did not attach value to them." What they wanted was agency. Koppers, the engineer, was to give his experience; and it was not surprising that he was to get half profits. There was no transfer of any one of the patents to the partnership. Assuming that the patents were partnership assets, the Court still had jurisdiction.

The Controller: It is clear that we find in the correspondence Koppers taking one line as to patents and Derry and Altenhein taking another view.

Mr. Gray: And the position is consistent with licence, and nothing more. The Master of the Rolls, said: "Nothing I have heard in the documents read by Mr. Terrell, or the argument he adduces, satisfies me there was any interest in these patents in the partnership. There was no capital in the partnership; and to my mind it is incredible there was anything more than something in the nature of a licence or permit to use these patents to the English firm." Lords Justices Bankes and Warrington spoke even more strongly.

The Controller reserved his judgment. It might, he said, be necessary on a future occasion to call on Messrs. Simon-Carvès to present their application for a licence.

Trade Mark Infringement.

Mr. Justice Sargant, in the Chancery Division, last Tuesday, had before him, on a motion for judgment, the case of *Rippingille's Albion Lamp Company, Ltd., v. Clark's Syphon Stove Company, Ltd.* For the plaintiffs, it was stated that the only question for consideration was as to costs. The claim was in reference to the infringement of a trade mark. Plaintiffs had used the trade mark "Sunrise" for gas-stoves; and until the defendants applied the name to stoves of their manufacture, there were no other stoves except the plaintiffs' which were sold under the title of "Sunrise." The defendants pleaded ignorance of plaintiffs' rights, but admitted the use of the word. They regretted that there had been an infringement, and said they had given instructions for the name to be changed. They were willing to submit to an injunction. His Lordship stated that he proposed to give plaintiffs the costs up to March 8, and also costs on the application for judgment as a short cause. The intermediate costs he would give to the defendants.

MISCELLANEOUS NEWS.

PLYMOUTH GAS COMPANY.

The Annual Meeting of the Plymouth and Stonehouse Gas Company was held last Thursday, at the works—Sir JOSEPH A. BELLAMY (the Chairman) presiding.

In their report, the Directors referred to the increasing difficulties experienced by gas undertakings owing to the continuance of the war, and said that the abnormally high charges for transport of coal and oil, together with the greater cost of labour and material, necessitated an increase of 8d. per 1000 c.ft. in the price of gas at Midsummer, 1916, and a further increase of 2d. as from Lady-day this year. The consumption of gas during the past twelve months was practically the same as for the previous year. The initial difficulties incidental to the transfer to the Company of Harvey's tar distilling works have been overcome; and the working results so far have proved very satisfactory—affording the Directors every confidence that their action in acquiring for the Company this most important business will be completely justified.

The CHAIRMAN, in moving the adoption of the report and accounts, said that on capital account there was an increase of £20,500 in the issue of debenture stock, for the purpose of taking over the tar distilling works of the late Mr. Harvey; and there had been an expenditure of £5156 on stoves, automatic meters, &c., which had increased the balance to the debit of capital account to £50,910. With regard to the revenue account, there was an increase of nearly £49,000 in the cost of coal and oil, due to the high charges for transport. Wages in the carbonizing department showed an increase of £1136, which was part of a total increase of over £4000 in the Company's wages during the year. On repairs of works there was a decrease of £328; and but for the large increase of wages, of over £1000, the decrease under this head would have amounted to about £1500. There was a decrease under the head of high-pressure mains and lamps. This department promised to be a great success before the war; but the restrictions on outdoor lighting had very adversely affected it. Rates and taxes had increased by £6330, which was accounted for by Excess Profits Duty £3429, and the increased rate of tax on a larger amount carried forward. The co-partnership bonus increased by £205, owing to a higher rate of bonus being allowed under the revised rules. The total amount of bonus for the year was £999; and it was credited to 219 co-partners, including 56 men on active service. With regard to the credit side of the account, they received £36,600 more from private consumers, the result of the increase in the price of gas during nine months of the year. Public lighting brought in £2700 less, owing to the official restrictions. From coke they had £2700, and from breeze £700 more; the higher price and larger quantity sold accounting for these increases. Tar showed an increase of nearly £1200, of which £900 was for benzol; and sulphate of ammonia, an increase of £2665, due to the higher price realized. The net result of the year's working was that, after allowing for dividends and interest upon the debenture stock, and carrying £3500 as usual to the renewal fund account, the balance carried forward was £39,146, as against £44,829 in the previous year.

COAL AND FREIGHTS.

Formerly they had all the coal supplies from Durham collieries by sea; but this method of transport ceased when the Government found it necessary to commandeer the ships. He had several interviews with the Board of Trade, but no practical help was forthcoming from them; and the Railway Committee and others to whom he applied were equally unable to help them. Finally, they got over the difficulty of transport by hiring 250 railway wagons, each of 15 tons; and they had achieved considerable success in getting coal from Durham by rail. At first the double journey took 21 days; but so thoroughly was the service organized that the average time was now 12 days. Splendid assistance had been rendered by the railway companies. Now another difficulty had arisen. The Government had recently told them they could not be allowed to keep the railway wagons, and they must buy coal nearer home, and so avoid these long railway journeys. He did not know how this would work out; but his opinion was that, as regards the time occupied, the wagons would be as much in use on shorter journeys as on the well-organized runs from Durham to Plymouth. But the action of the Government meant the use of coal raised near at hand, much of which was unsuitable for their purposes. For instance, they needed coal of good coking quality. If they produced much breeze, they could not sell it; and for the manufacture of carburetted water gas, they must have a really good coke. Another difficulty created by the action of the Government was that it threatened to deprive the Company of the benefits of the Coal Prices Limitation Act. They had the advantages of the Act in their dealings with the Durham collieries, which were supplying them before the war; but if they were driven to make purchases in Yorkshire or elsewhere, they would have no right to demand the same consideration, and the question would arise whether the Government would compensate them. It would be very unjust for the shareholders to be punished, and inequitable if they had to sacrifice thousands of pounds for the benefit, perhaps, of other gas undertakings which happened to be nearer the coalfields. This position would be laid before the authorities. Whatever the source of the supply, the coal would still have to be brought by rail. They had a very fair stock of oil on hand, and hoped it would enable them to overcome the difficult days ahead. In the meantime, they were using as little oil as possible.

NEW CO-PARTNERSHIP RULES.

The increase of £4000 in the wages bill touched the co-partnership scheme. The scheme worked very well indeed until the Government, with a lack of judgment, rushed up wages in their own establishments far beyond what was necessary. But when men in their employ who were getting not more than £3 a week saw unskilled men in Government employ bringing home £9 a week, it was only human nature that they should want to know the reason why. Personally, he had no grievance against their employees. Many of them, however, thought proper to join the Dockers Union; and this produced a condition of things which rather upset the intentions of the Directors and shareholders when the profit-sharing system was introduced—the intention that it should be a means of bringing the workmen and Directors into closer touch, so that all differences might be equitably adjusted. This intention was realized till the Dockers Union thought it was necessary to demand a big increase in wages. The result was a Board of Trade arbitration; and the advance was granted. The gas undertakings in the district had no weight. It was then pointed out by a committee of the men that, owing to the increase in the price of gas, there would be no bonus under the co-partnership rules as they stood; and in September last a new scale was adopted, and the rules revised. About two-thirds of the employés, including those on active service, accepted the new conditions and received the bonus, and one-third remained outside. The Directors considered co-partnership was on its trial. The benefits on both sides were destroyed if they had to look upon these men as strangers and not partners, with whom they could settle differences in a friendly way as man to man, and these men joined unions, under whose rules they were obliged to come out on strike because a dispute, not even connected with the gas industry, occurred at some distant place—like Liverpool. If further trouble occurred, and the co-partnership scheme could not be worked equitably, it must be dropped. It was the shareholders' money which went to pay the bonus; and it was for them to say whether they would continue it.

GOVERNMENT AND THE SLIDING-SCALE.

Gas companies generally had felt the influence of the war in its relation to the sliding-scale. Undertakings in the position of Plymouth, in being remote from the coalfields, were specially affected. Because they were at Plymouth and not at Newcastle, they had to pay for the conveyance of coal by rail about four times the amount previously paid for its conveyance by ships. Gas undertakings near the coalfields were not suffering under this disability to anything like the same extent. If gas companies' expenses, through these high freightage and other war charges, continued to pile up, their dividends might disappear altogether. It was not fair to those who had invested their money under the statutory conditions and obligations of the sliding-scale. Municipal authorities, who were competitors with them, raised their money from the public; and war or no war, the interest was paid. Why was the sliding-scale introduced? It was to give ratepayers and consumers fair treatment and a share in the prosperity of gas companies. These statutory obligations were imposed at a time when there was an implied guarantee of a monopoly of lighting. Developments came, and electricity was introduced; and many thought that, when the old monopoly no longer existed, and municipalities were empowered to run opposition lighting undertakings, the obligations under the Gas Acts should be modified. Since the war began, gas companies had become better organized. The National Gas Council were considering the question of appealing to Parliament to rectify the grievance of the sliding-scale; and he hoped a firm attitude would be taken up. In existing circumstances, the sliding-scale ought to be suspended or very much modified. They were entitled, as an industry, to a fair chance of living; and as, for the country's benefit, serious obligations were placed upon them which had the effect of reducing their dividends, there should be corresponding consideration of their position. As a member of the Council, he should take a very strong line on this subject. Lord Moulton had recently declared that the gas companies had been the salvation of the country in the contribution which they made to the supply of explosives. In return for these services, they were surely entitled to some consideration. In Plymouth, they heartily responded to the appeal of the Ministry of Munitions, and lent the services of their Engineer (Mr. P. S. Hoyte) for the supervision of the work of producing explosives from the gas-works of Devon and Cornwall. In this matter they did not consider the question of profit; and they were entitled to be treated with generosity by the Government in return.

SCIENCE OF THE GAS INDUSTRY.

With regard to the future of the gas industry, he was not in the least pessimistic. Modern methods were being introduced and a far-sighted policy adopted; and he looked forward with no misgivings. Too little had as yet been done in the development of science, and especially of chemistry. The gas companies were now in closer association; and he trusted the municipal undertakings would be willing to join hands with them, so that they might unite in the promotion of scholarships and other means of providing technical education for the advantage of the industry. He had no doubt that if a reasonable proposal for a contribution for such a purpose were put before them, the shareholders of the Company would readily respond to it. It was a vital thing, in his judgment, that the industry should have at its command the best talent the country could produce, and that encouragement should be given to young men to work and to study by the offer of the reward of well-paid situations.

EXCESS PROFITS DUTY.

As to the Excess Profits Tax, it certainly was an anomaly that they should be called upon to pay it when they were receiving less dividend. What actually happened was that last year they carried forward a larger balance to meet burdens which they foresaw would fall upon them, and to avoid fluctuations in the price of gas. The Inland Revenue Authorities, to their astonishment, regarded this additional balance as excess profit. They were right in theory; and they got the money. But the Company had a right to claim its return this year, now that they had a deficiency; and they would make this claim.

The report and accounts were passed, and a dividend was declared of 4¾ p.ct. per annum on the ordinary stock for the half year, with corresponding dividends on the additional and new shares.

One of the workmen representing the co-partners thanked the Directors and shareholders for the action which had been taken in regard to the bonus, and said that if the men who stood out looked into the matter a little closer they would be of his opinion—that the scheme was beneficial to them.

Thanks were accorded the Directors and officers; and formal approval was given to any action the Chairman may take in the interest of the Company as a member of the National Gas Council.

EDINBURGH AND LEITH GAS COMMISSIONERS.

Increased Bonus to the Clerical Staff.

At a Meeting of the Commissioners on Monday of last week, it was reported that the Sub-Committee which had been appointed to consider what advances of salary or additional bonuses should be granted in the clerical departments [see "JOURNAL," June 5, p. 439] had recommended that the present war bonuses paid to the permanent members of the clerical staff in the Engineer's Department and to the permanent members of the clerical and collecting staffs in the Treasurer's Department be increased as follows: Males to £20 16s. per annum (8s. per week), females to £10 8s. per annum (4s. per week), and apprentices to £6 10s. per annum (2s. 6d. per week); the increased bonuses to run from May 15, 1917, during the war, and thereafter at the Commissioners' pleasure. They also recommended that three members of the Engineer's Department should receive advances of salary of £50, £50, and £25 respectively, and two members of the Treasurer's staff of £25 each. The suggestions as to bonuses were agreed to by the parent Committees; but they amended the recommendations as to increases of salary to £25, £25, £20, £20, and £20. The Commissioners unanimously approved the amended recommendations. They also authorized the Engineer to give, as from April 1 last, to the employees in the Engineering and Foundry Departments the same war bonus as was awarded by the Committee of Production to the members of the Federated Societies.

Councillor LINDSAY explained that the Works Committee, at a meeting that day, had considered a letter from the Consulting Engineer (Mr. W. R. Herring) regarding the retort men [*see* "JOURNAL," May 8, p. 252]. Mr. Herring recommended that, as a war task, and for the period of the war only, the following offers should be made: (1) Each gang of three men to operate twelve more retorts, and receive therefor an increase in pay of 6s. 8d. per week; or (2) each gang of three men to operate eight more retorts, and receive 4s. 6d. per week additional wages. Alternatively, one of these proposals might be accepted as a war task during the six winter months only, when there was a difficulty in obtaining the full number of men required. The suggestion was agreed to.

The Commissioners were informed by the Clerk that the question of the rental clerks' salaries and the wages of the gas-fitters would not form a part of the forthcoming arbitration proceedings. The former had been dealt with, and the latter were paid the standard rate of wages, less ½d. per hour in respect of special benefits. If the retort men accepted the proposal now made, they also would be taken out of the arbitration inquiry.

SALE OF GAS, &c.

The TREASURER (Mr. A. Canning Williams) reported that the quantity of gas sold during the spring term was 498,854,100 c.ft., value £82,549—a decrease of 15,814,900 c.ft. (3·07 p.ct.) in quantity, and of £2182 in value. The figures for the year ended May 15 were as follows: Quantity of gas sold, 1,874,114,100 c.ft., value £309,814—a decrease in quantity of 75,299,900 c.ft. (3·86 p.ct.), and an increase in value of £12,645. The sale, though showing a falling-off compared with the previous year, was slightly in excess of the quantity estimated last September, which was within 3,000,000 c.ft. of the actual figure. The total amount of cash received during the year was £450,910.

BELFAST GAS-WORKS REPORT AND ACCOUNTS.

The report of the Belfast Corporation Gas Committee, for the year ended March 31, was presented to the Borough Council yesterday (Monday). It showed that the gross profit on the manufacture and sale of gas and residuals is £38,696, being a decrease of £45,305 compared with last year. Adding the rents received from property purchased for gas-works extension (£310), interest received from the bank (£142), and the profit on the working of the stove department (£1125), there is a total gross income of £40,273. From this have to be deducted dividend and interest charges, leaving a net profit of £16,713, which is a decrease of £45,715 compared with last year's net profit. Adding the balance forward from last year of £29,246 gives a total at the credit of profit and loss of £45,959. From this there are deducted the following items: Amount carried to sinking fund, £9674; sinking fund and interest for purchase of old abattoir site, £1233; amount carried to reserve for insurance of works, £1600; amount carried to the contingent renewal fund, £3000—leaving a balance of £30,452, out of which there have been contributed for public purposes the following amounts: Finance Committee, in aid of the rates, £5000; and dividends and sinking fund on the new City Hall stock, £11,371—leaving a balance to be carried forward to the credit of the profit and loss account of £14,081.

Alderman JAMES CRAIG, J.P., in presenting the accounts, said that the decrease in the gross profit, as compared with the previous year, was £45,305. When submitting the last annual report, he pointed out that the prospects for the year on which they were then entering were not at all bright. Unfortunately, this proved to be correct; and as the months passed, expenses rose so rapidly that the Committee were compelled to increase the price of gas as from April 1 last to 2s. 4d. per 1000 c.ft. net. The reason for this would be apparent when he said that coal alone cost £75,484 more than in the previous year; while other increases for oil, taxes, war bonus, and half-pay to men in the army and navy raised this amount to £104,492. Against this, the extra revenue from the sale of gas, coke, and other residuals realized £59,187, making the decrease £45,305. In spite of these extra charges, they had been able to keep the price of gas lower than in the majority of cities in the United Kingdom. It should be remembered that gas cost 2s. 3d. per 1000 c.ft. in 1904, and that to-day, under existing abnormal conditions, it was only 2s. 4d. net, although the price of coal had more than doubled in the meantime. They had now bought the bulk of the coal that they required for the present year, and had been able to secure it at about the same price as under the last contracts. The supply of gas oil, however, was altogether different; the rate of freight being eleven times higher than in normal conditions. It was, therefore, estimated that their supplies of oil this year would cost at least £15,000 more. Other extra expenses would be: Wages, £6000; renewing retorts, £3000; and sundry materials, £5000, *plus* an estimated loss from residual products of £8000, making a total of £37,000. It was calculated, however, that the additional revenue to be derived from the recent increase in the price of gas would about balance this amount. The contractors had not yet been able to finish the last section of the vertical retort installation, owing to difficulties in transport of materials; but it was hoped that the work would be completed within the next two months. They were paying the Finance Committee £5000 in aid of the rates, as promised last year, and also providing £11,371 to meet the sinking fund and dividends on the City Hall stock. The balance carried forward to the credit of the profit and loss account would be £14,081. It was satisfactory to note that the output of gas showed an increase of 72 million c.ft. No doubt this would have been much larger had the lighting hours not been reduced by the Summer Time Act. He wished to take the opportunity of thanking the officials and the employees of the department for the attention and interest they had displayed during the year; and he had no doubt they would continue to work harmoniously together for the good of the undertaking.

In his report, the Engineer and Manager (Mr. J. D. Smith) said the decrease in the gross profit was entirely attributable to the enormous increase in the cost of all materials required in the business. The gas sold during the year through ordinary meters showed an increase of 48 million c.ft., and through prepayment meters 24 million c ft.—a total of 72 million c.ft.—the increased revenue amounting to £23,862. Coke showed an increase of £24,766, coal tar of £1838, and ammoniacal liquor of £3301. On the other hand, the increased costs were very heavy. The principal item under this head was coal, which cost £75,484 more than in the previous year. The main cause for this arose from freight, which was now three times what it was before the war. Fortunately, the action of the Government in regulating prices prevented the collieries from raising rates to the same extent; otherwise the position would have been desperate. Even as it was, great difficulty was experienced in getting adequate supplies; and it was only by constant pressure on contractors that they were able to keep going. The outlook for the coming winter was anything but bright; but with the help of good stocks which he was accumulating, he hoped to pull through. Gas oil during the past year cost £1357 over the preceding twelve months. Arrangements had now been made by which it was hoped to obtain the balance of the contract before the winter set in; and, if so, they should have sufficient to carry them on till the end of the financial year. This oil, however, would only be obtained at very heavy cost. Other increases in expenditure included rents and taxes £12,245, war bonus £2841, repairs and maintenance of plant £1412, coke and oil for water-gas plant £3868, and wages, fuel, and repairs of water-gas plant £3304. The demand for gas appliances of all kinds was very large, and was likely to grow rapidly. The citizens were coming to realize that for convenience and economy gas was the best medium for lighting, heating, or power purposes.

The working statement accompanying the accounts shows that the quantity of coal gas made was 1,765,230,000 c.ft., and of water gas 877,362,000 c.ft.; the total being 71,060,000 c ft., or 2·76 p.ct., more than in the preceding year. The make of gas per ton of coal was 13,326 c.ft., per ton of oil used 140,518 c.ft., and per ton of coke used 54,248 c.ft. The oil used per 1000 c.ft. of gas figures at 1·859 gallons, and the unaccounted-for gas at 5·49 p.ct.

LEEDS GAS UNDERTAKING.

The report submitted last week to the Leeds Gas Committee by Mr. W. B. Leech (the Engineer) shows a total revenue for the past twelve months of £490,652. The total expenditure was £356,328; leaving a gross profit of £134,324, as compared with the previous year's gross profit of £126,300. The payment of £11,330 in income-tax, £3965 in war allowances, £47,545 interest, £49,723 to redemption fund, and £20,585 contributions to capital, leaves a surplus of £1176. The gas revenue has been £334,559, as against £309,948; and revenue from residuals has increased from £115,411 to £141,828. The market for residuals, particularly coke, has been favourable. The cost of coal increased by £35,299, and the war bonus paid by £3300, being now £6521. Carbonizing wages increased from £23,895 to £25,789.

The sale of gas increased from 2,610,212,000 to 2,738,694,000 c.ft. or an increase of 4·9 p.ct., despite the large decrease in consumption for lighting purposes as compared with the last pre-war year. The war has created a great development at the Leeds works in the gas-furnace branch; the consumption for this purpose having increased 181·3 p.ct. The total capital expenditure to the end of March was £2,105,408; the amount expended on capital account during the past year having been £61,429. The net debt on capital account has been reduced by £8899 during the year, and now stands at £1,097,842, having been reduced by £175,682 since 1910. The amount of coal carbonized during the past year, including the coal equivalent of oil used in the manufacture of carburetted water gas, was 263,981 tons—an increase of 9835 tons, or 3·8 p.ct. The gas sold per ton of coal had increased from 10,270 c.ft. to 10,374 c.ft. The total length of mains of the undertaking is 1015 miles; 2508 yards having been added last year. The number of meters fixed was 118,273—a decrease of 159 on the previous year. The gas-cookers in use in the city was 13,239—an increase of 1808; cookers with prepayment meters, 10,389—a decrease of 255; grillers, 19,492—an increase of 107; gas-fires, 4693—an increase of 1884; radiators, 1669—an increase of 196; other appliances, 174—an increase of 15.

Mr. Leech reported that the works had been maintained in efficiency out of revenue during the year, and considerable progress had been made with the scheme for the reconstruction of the Meadow Lane works, where completion had been reached in the vertical retorts, the pump-house, turbo-exhauster, purifiers, and oxide handling plant. At New Wortley, the telpher plant for coke handling is now in use.

SOUTH BARRACAS GAS COMPANY.

The Twenty-Seventh Ordinary General Meeting of the South Barracas (Buenos Ayres) Gas and Coke Company, Ltd., was held last Thursday, at the London Offices, No. 1, East India Avenue, Leadenhall Street, E.C.—Mr. J. C. IM THURN (the Chairman) presiding.

The SECRETARY (Mr. W. Upton) read the notice convening the meeting, and the report of the Auditors.

The CHAIRMAN, referring to the accounts for the twelve months ended Dec. 31 last, said the result of the year's working had been a debit balance of £3267 in South Barracas—the first time this had occurred. The addition in London of interest on loans and advances (£6443) brought the total debit this year up to £9710. The accounts did not call for much comment. Economy in all directions had been carried to the extreme limit. Manufacture had cost £7737 more, due entirely to the increased cost of gas-making materials. London expenses were less; but interest on loans and advances showed a small increase of £444. On the other side, sales of gas exhibited a slight decrease; but residuals having sold at high prices, there had been a gain of £3573. A large part of this was due to the ability of the Manager (Mr. R. B. Brown) in devising means for using wood and charcoal in the carburetted water-gas plant, and so saving the total make of coke for sale. Further coal had now become impossible to obtain; and during the current month their supplies would become exhausted. The Board had, however, every hope that the Manager would be able to carry on by making use of wood and oil of various kinds. A good feature, and one that spoke well for the management, was that, notwithstanding general financial troubles on the other side, the bad debts had been reduced to £438, as against £1083 for the previous year. The Manager reported that his new methods of using wood in place of coal had considerably improved the financial position; so that the worst of the crisis was in all probability now past. He further considered that the proprietors could look to the future with more confidence than it had been possible to do for some time. During the past year, many attempts had been made to induce the Municipalities in their district to allow a temporary increase in the price of gas to compensate for the very high price of coal and oil; but, unfortunately, these efforts had not met with any success. Gas sales had shown a small increase, which was most encouraging; but while the war continued, they had to strain every effort to keep the business together. The property was a good one, and on a return to normal conditions should show progress and expansion. Their relations with the Municipalities remained good, as usual, though a sum was owing for public lighting services which it was extremely difficult to collect. Were it possible to obtain payment of these accounts, the financial position would be considerably eased; but, as it was, the Company were in great difficulties for funds to carry on. The interest on loans at the bank for 1916 was provided by the Directors; but the shareholders must now come to the help of the Board, and provide sufficient money to enable the Company to be carried on. A scheme was being considered whereby a portion of the present first mortgage debentures might be made available on terms and offered to the shareholders. It was much to be hoped that the position the undertaking had been placed in (due to the war) would be understood, and that a good measure of support would be given by all towards saving the Company. The Directors had waited now for nearly three years for a favourable moment; but the matter was one that could no longer be postponed.

The report and accounts were adopted.

DIRECTIONS AS TO THE SALE OF COAL.

Schedule of Export Prices.

The Controller of Coal Mines (Mr. Guy Calthrop) has issued a code of directions as to the sale of coal, with a view to dealing with fluctuations in colliery prices which have recently occurred in certain districts owing to abnormal market conditions, and to preserving the necessary regularity in the distribution of coal. The directions mainly affect the prices of coal for export and bunker purposes, for which a definite schedule of prices has been drawn up; but they also provide, as will be seen, that the pit prices of coal for home consumption shall remain at the *maxima* prescribed by the Price of Coal (Limitation) Act.

I.—SALE OF COAL FOR CONSUMPTION IN THE UNITED KINGDOM.

No coal shall be sold by collieries for consumption in the United Kingdom except at the maximum prices under the Price of Coal (Limitation) Act.

II.—SALE OF COAL FOR SHIPMENT TO FRANCE AND ITALY (AND POSSESSIONS AND PROTECTORATES).

The prices specified in the schedule shall be charged as fixed prices in the case of all sales of coal after June 28, 1917, for shipment to France and Italy, including coal for the manufacture in the United Kingdom of coke-oven coke or of patent fuel for shipment to these destinations. These prices are net f.o.b. at the nearest shipping ports to the collieries, and for cash within seven days after shipment. If shipped at a more distant port, the extra railway and shipping dues may be charged. The prices are net; and no discount, rebate, or allowance of any kind, either in money, quantity, credit, or otherwise, is to be given to any buyer. The quantities to be paid for shall be the quantities certified by the colliery, railway, or harbour authority, as customary. Exporters, whether coalowners or merchants, shall charge in addition remuneration at the rate prescribed below.

Clauses follow dealing with exporters' services and applications for export licences.

III. SALE OF COAL FOR SHIPMENT TO DESTINATIONS OUTSIDE THE UNITED KINGDOM OTHER THAN TO FRANCE AND ITALY (INCLUDING COAL FOR MANUFACTURE IN UNITED KINGDOM OF COKE-OVEN COKE OR OF PATENT FUEL FOR SHIPMENT TO DESTINATIONS IN QUESTION), OR FOR USE AS BUNKERS (INCLUDNG COAL DISPATCHED TO COALING STATIONS).

In no case shall coal be sold for these purposes at prices less than the fixed prices applicable in the case of sales to France and Italy, set out in the schedule. These prices are net f.o.b. at the nearest shipping ports to the collieries, and for cash within seven days after shipment. If shipped at a more distant port, the extra railway and shipping dues may be charged. The prices are net; and no discount, rebate, or allowance of any kind, either in money, quantity, credit, or otherwise, is to be given to any buyer. The quantities to be paid for shall be the quantities certified by the colliery, railway, or harbour authority, as customary. Exporters, whether coalowners or merchants, shall charge in addition remuneration as prescribed below.

Clauses again follow dealing with exporters' services and applications for export licences.

IV.—GENERAL PROVISIONS.

(1) On every sale of coal by a colliery after June 28, the colliery shall specify whether the coal is sold for consumption in the United Kingdom, shipment to France or Italy, shipment to other destinations, or as bunkers, including coal dispatched to coaling stations, or use in the manufacture of coke-oven coke or patent fuel for shipment to France or Italy, or to other destinations outside the United Kingdom, as the case may be.

(2) On every purchase of coal for re-sale, the purchaser shall undertake that the coal will be used for the purpose specified by the colliery; and, in the case of sales for shipment, that all the conditions applicable to the sale contained in these directions will be complied with.

(3) On proof of breach of these directions by any person or firm, in addition to the penalties prescribed by section 1 of the Trading with the Enemy and Export of Prohibited Goods Act, 1916, existing export licences may be revoked, and all further licences refused to such person or firm for the period of the war, or such other period as may be determined by the War Trade Department.

(4) The following contracts are not to be interfered with by these directions:

(*a*) All contracts entered into before May 1, 1917.
(*b*) Existing contracts for purchase of coal or coke-oven coke which has already been sold or re-sold—
  (i) to consumers in the United Kingdom;
  (ii) to purchasers abroad;
  (iii) to shipowners for bunkering their own steamers (including holders of steamers on time charter);
  (iv) to manufacturers of coke-oven coke and patent fuel.

(5) These directions will not apply to any coal purchased by the Admiralty.

SCHEDULE OF PRICES FOR EXPORT.

The following figures are taken from the schedule of prices referred to in the directions:

Monmouthshire and South Wales.

	Price Per Ton. s.	d.
BITUMINOUS.		
Best households	33	0
Good households	30	9
No. 3 Rhondda large	30	9
Smalls	26	0
No. 2 Rhondda large	27	0
Through	25	0
No. 2 Smalls	20	0
BITUMINOUS (SWANSEA).		
Through and through	27	0
Smalls	24	0
COKE-OVEN COKE	47	6

Northumberland.

GAS.		
Class I. Mickley	26	6
Class II. All other gas coals from Northumberland	23	6
COKE-OVEN COKE	42	6

Durham.

GAS.		
Class I. Easington, Stella, Thornley, Londonderry, Wearmouth	26	6
Class II. Boldon, Hetton, Holmside, New Pelton, Ryhope	25	0
Class III. Brandon, Burnhope, West Leverson Consett, Deafhill, Deans Primrose, East Pontop, Felling, Horden, Lambton, Pelaw Main, Pelton, Priestmans, Ravensworth, Sherburn, South Derwent, South Pelaw, Usworth, Wallsend and Hebburn, Washington, West Pelaw Main (and other coals not specified)	23	6
COKE-OVEN COKE	42	6

Notts, Derby, and Yorks.

GAS.		
Screened	26	0
Nuts	25	6
Unscreened	25	0

Lancashire.

GAS.		
Screened	26	0
Unscreened	25	0

Scotland.

COKE-OVEN COKE	40	0

HEYWOOD CORPORATION GAS-WORKS.

Mr. W. Whatmough, the Engineer and Manager of the Heywood Corporation Gas-Works, in his annual report, states that the gross revenue for the year ended March 31 amounted to £26,627, and the expenditure (less interest and sinking fund) to £21,140, leaving a gross profit of £5487, or a decrease of £643 compared with the previous year. After payment of £5769 for interest and sinking fund, there is a net loss of £282.

The receipts for gas sold for all purposes amounted to £19,685, compared with £19,553. The sum received for public lighting for the year was only £49, compared with £505 prior to the war. Receipts for residuals and spent oxide showed an increase of £1125. The expenditure on manufacture of gas was £14,242, compared with £12,988. Coal cost £929 more; but as the quantity carbonized was only 11,110 tons, as against 11,769 tons the previous year, the average increased cost per ton of 2s. 8·26d. represents a total of £1492. Compared with five years ago, the actual cost per ton of coal carbonized was 19s. 9·43d., against 13s. 5·24d., or an increase of 6s. 4·19d. per ton, representing a total increased charge for coal only of £3527. This amount would have been considerably more but for the saving of 1277 tons of coal by the adoption of the new system of carbonization. Purifying materials again show a balance to credit of £134; and carbonizing wages also show a saving of £218, although the rate of pay has been increased, due to the vertical retorts being in operation for a longer period than the previous year. This further resulted in an increased make per ton of 264 c.ft., thereby saving 244 tons of coal. Rents, rates, and taxes amount to the large sum of £4071. The increased charge for the past year compared with five years ago is £251 for rates and £1505 for income-tax, or a total of £1756. The increased charge for interest and sinking fund for the same period is £250, or a grand total of £2006 additional charge against revenue to meet, in addition to the increased cost of coal, other materials, and wages. The cost this last year for rates and taxes, interest, and sinking fund is 1s. 7·08d. per 1000 c.ft. of gas sold.

The gas made per ton of coal carbonized was 12,297 c.ft., as against 12,033 c.ft. for the previous year. The quantity of oil used was 80 gallons, against 776 gallons. The quantity of gas manufactured amounted to 136,626,000 c.ft., or a decrease of 4,987,000 c.ft.; and the quantity sold, as registered by the consumers' meters, was 123,792,942 c.ft., or a decrease of 4,574,096 c.ft. The total decrease in gas sold compared with the year ended March 31, 1914 (pre-war), is 11,067,000 c.ft., or 8·08 p.ct. The unaccounted-for gas was 10,533,108 c.ft., or 7·70 p.ct.

Concluding, Mr. Whatmough says: Considering the increased charge against revenue, the small loss of £282 for the year will, no doubt, be regarded by the Committee as satisfactory; and I would suggest that the deficit be paid from the reserve fund. The outlook for the coming year is not encouraging; and although there is every indication that the deficit next year will be considerably more than in the present one, I do not recommend a further increase in the price of gas at present.

YEAR'S RESULTS AT BLACKBURN.

The report on the results relating to the Blackburn Corporation gas undertaking for the past financial year is signed by the Chief Clerk (Mr. T. Hannibal) and Works Superintendent (Mr. C. W. Ward).

It is stated that there is a gross profit on the year's working of £28,082; and after meeting interest and sinking fund charges, amounting to £32,792, and extensions (new plant) charged to revenue account for the financial year, amounting to £3734, there is a net loss on the working of £4639.

The average weekly number of employees has been 224, compared with 210 during the previous year; and the total wages bill has been £22,363, against £19,411 for the previous year. The average weekly wage has been £1 18s. 5d.; while the previous year it was £1 15s. 6d. During the year the rates of wages have been increased, costing the department £2200 per annum.

The consumption of gas during the year was 719,293,000 c.ft., as compared with 768,060,000 c ft. during the previous year, being a decrease of 48,767,000 c.ft., or 6·78 p.ct. The consumption per ordinary meters was 389,487,400 c.ft., or 54·15 p.ct.; slot meters, 273,881,500 c.ft., or 38·07 p.ct.; public lighting, 3,261,800 c.ft., or ·45 p.ct. Unaccounted-for gas amounted to 44,400,100 c.ft., or 6·18 p.ct. The number of ordinary meters was 13,678, with an average consumption of 28,474 c.ft.; automatic meters, 23,227, with an average consumption of 11,792 c.ft. The gas sold at special rates for industrial purposes amounted to 40,523,000 c.ft., as compared with 34,259,000 c.ft. in the previous year.

There are now 2735 gas-lamps in the area of supply; but, owing to the restricted lighting, only 527 are in use. There are 77 employees of the department serving with His Majesty's forces; and the weekly payments to their dependants amount to £29. The allowances paid during the year came to £1286, as compared with £1210 for the previous financial year.

The loss of £4639 on the year's working is more than accounted for by the following increased costs: Coal and oil, £5549; income-tax, £4000; extensions (new plant), £3734; wages, £2952; maintenance of works, £2282. Against these figures, the cost of purification has been reduced to £422, as compared with £2245 last year; while residual products have yielded £1500 more, and sales of gas £3000 more. The condition of the carbonizing plant is still a source of considerable anxiety, and is likely to remain so until the proposed new plant is installed. It is pointed out that all extensions and alterations form part of the general scheme for the reorganization of the undertaking, as formulated by the late Mr. Morton Fyffe. The greater part of this scheme—vertical retorts, &c.—is being held-up by the refusal of the Local Government Board to sanction the necessary loan.

SPENBOROUGH GAS UNDERTAKING.

The figures for the year ended March 31, in connection with the Spenborough District Council's gas undertaking, were presented in the course of a tour of inspection of the works by the combined Gas Committee of the townships of Cleckheaton, Liversedge, and Gomersal, which go to make Spenborough, under the recent amalgamation.

The Chairman of the Committee (Mr. J. Hirst) outlined the history of the undertaking, and mentioned that the concern went back as far as 1837, when there was a small Company at Rawfolds, with a capital of £3500 in £10 shares. The works became too small, after some years; and new ones were built at Marsh. These were the works now called the old works. The undertaking was purchased by the Cleckheaton Local Board in 1870, for £23,562; and extensions and repairs at an early date after acquisition cost £30,000. Since then the needs had again increased, and the works at Moorend, the latest part of the undertaking, were constructed and completed in 1914. Mr. Hirst said the greatest credit was due to Mr. A. L. Jennings (the Engineer and Manager), for the manner in which he had made the works a success during the past twelve months; and the Gas Committee had been greatly assisted by the Council generally and by the staff and employees. They had all worked harmoniously toward the one end. During the year, the consumption of coal had been reduced 867 tons; but the output of gas had increased by 361,000 c.ft.—the increased make of gas per ton averaging 851 c.ft. Although the rates of pay had advanced, £635 less had been paid in wages. It would be agreed that they had a creditable plant, and a most satisfactory year.

Mr. W. E. Veasey (the Accountant to the Council) said in 1870 the make of gas was only about 30,000,000 c.ft.; while last year it was 144,362,000 c.ft. The new works were designed to produce 1,000,000 feet per day, though this would require the putting down of a fifth retort setting, which was not considered necessary at first, The Council's Order of 1913 allowed the raising of £50,000 for the new undertaking; but the provision of a holder and of sulphate of ammonia plant having been postponed for the time being, the actual sum sanctioned to be borrowed was £39,755, in addition to which £3438 had to be provided out of revenue in respect of superseded works. So the total must be taken at £43,193, of which, up to the year-end, £42,348 had been expended. By the various Orders the aggregate capital authorized was £125,000, of which £93,435 had been actually raised up to date. The present debt was £48,239. In 1870, the price of gas was 4s. 6d. per 1000 c.ft.; while now it was 3s. for domestic use, with a discount of 10 p.ct., and 2s. 8d. for industrial use, less a discount of 15 p.ct. The actual gas sold last year was 133,830,000 c.ft., compared with 86,541,000 c.ft. in 1901, and the estimated net profit was £4077, a percentage on the capital of 8·45, as against a net profit in 1901 of £743, or a percentage of 2·3. The Committee had decided to set aside £500 yearly for renewal of retorts.

After giving an outline of the nature of the new works, in which gas making began September, 1914, Mr. Jennings said the only drawback was that additional retorts were already desirable. In the old hand-fired works 22 men were employed in winter; whereas now, with mechanical charging, only six were required in the retort-house. After describing features of the plant, fully detailed in the "JOURNAL" on the occasion of a visit to the works by the Yorkshire Junior Gas Association, he expressed appreciation of the loyalty of his staff and the good time-keeping of the men.

The visitors then inspected the new breeze washer, which was designed by Mr. Jennings, and built by Messrs. Waller and Son. It is capable of dealing with about 30 cwt. of breeze per hour. A revolving cylindrical screen, set at a slight downward slope, is fed from a small hopper filled by hand. From the upper half of the cylinder the dust falls through small perforations into a heap below, while the larger particles for washing fall direct into a water-trough through openings of sufficient size in the lower half. The pieces large enough to be put to other uses are shot out dry at the cylinder end. In the water-trough the coke particles and impurities separate by gravity; and while the coke is ejected at one end by a device which at the same time effects the needful agitation in the trough, foreign matter is recovered from the bottom by the buckets of a small continuous conveyor, and deposited in a separate heap on the ground. The power is secured by a shaft from the works engine-house; and the water used in washing is clarified and returned for use again. The dust and the eliminated impurities are burnt under the works boilers with forced draught, and raise all necessary steam for works purposes.

After refreshments had been enjoyed at the offices, appreciative speeches were made by the visitors. Mr. J. H. Collier (the Chairman of the Council) expressed the hope that when the war was over they could proceed to obtain powers to buy the Gomersal gas undertaking, and supply Gomersal as well as the districts now served. The other part of the Council's district—Liversedge—raised a bigger question. Mr. Collier paid a tribute to Mr. Jennings and his washing plant.

WEST BROMWICH GAS-WORKS REPORT.

Price of Gas for Power and Industrial Purposes.

In his third annual report to the West Bromwich Gas Committee, dealing with the year ended March 31, Mr. W. H. Johns, the Engineer and Manager, under the heading of maintenance, sets forth the work carried out, and says two new purifiers with connections have been installed, at a cost of £2130, which amount has been charged to revenue. The increased cost of labour and materials due to the war, and the great difficulty in obtaining the various kinds of material necessary to carry on the works, have not diminished during the year. The rateable value of the gas-works was increased by £1200, when reassessed in August last. This item and an increase in income-tax have appreciably affected the profits on the year's working.

The quantity of coal carbonized was 33,790 tons, as compared with

32,032 tons in the previous year; the quantity of coal gas manufactured per ton of coal carbonized being 12,257 c.ft., against 12,201 c.ft. The cost of coal has again advanced; and the price of gas oil is now rendering the manufacture of carburetted water gas prohibitive. This plant has only been worked at times when the shortage of available labour for gasmaking rendered it imperative. At present there is, approximately, three months' supply of gas oil in reserve; and Mr. Johns reminds the Committee that this was bought at the pre-war price. Since the date of purchase the price has increased 400 p.ct.; and, moreover, supplies are now practically cut off. Anxious days and nights were experienced last winter, owing to insufficient deliveries of coal and lack of the labour necessary for handling coal from stock. The quality of the coal has not been so good as hitherto; but it has been necessary to accept what was offered. The cost of manufacturing carburetted water gas was 20·69d. per 1000 c.ft., as compared with 15·96d. for the previous year. The quantity of carburetted water gas made was 3·23 p.ct. of the total make. The increased cost of manufacture was due chiefly to the higher cost of gas oil. Spot lots were bought, and used to prevent depletion of stocks at the works.

The following is a summary of the principal working results obtained during the year, as compared with the previous year's working:

	1916-1917. C.Ft.	1915-1916. C.Ft.	Increase.
Gas made	427,997,295	423,797,000	—
Gas sold	399,185,629	395,283,868	1·1 p.ct.
Gas used on works	6,470,000	5,831,000	—

Manufacturing Costs.

		Per 1000 C.Ft. Sold.		Per 1000 C.Ft. Sold.
Coal for carbonizing (including oil, &c.)	£37,392	1s. 10·48d.	£32,056	1s. 7·50d.
Wages at gas-works	£4,118	2·48d.	£3,368	2·06d.
Repairs and Maintenance of works and plant	£7,328	4·40d.	£6,206	3·77d.

Purification.

Wages have increased from £186 to £267; but a profit has been made on purification, owing to the high prices which have been realized on spent oxide of iron.

The output of gas for the first nine months of the year showed a considerable reduction on the previous year—namely, 10,310,749 c.ft.; but in the last quarter of the year this was made up, and on the year an increase of 1·1 p.ct. was delivered.

The gross profit for the year amounted to £13,072, as compared with £13,183 last year. Interest and sinking fund charges came to £10,343, as against £10,338; and the net profit was £3011, against £2845.

As to residuals, the value of coke increased considerably during the year; and the quantity available for sale was again more, having risen from 8·6 to 8·92 cwt. per ton of coal carbonized. The revenue from coke sales also increased—a larger tonnage being available for sale, owing to a smaller amount having been used for the manufacture of carburetted water gas. At the moment, it is unprofitable to extract cyanogen; and the process has therefore been discarded.

Public lighting was discontinued until Feb. 14 last, when 22 high-pressure lamps were lighted in the High Street. During the summer months they will not be used. The average consumption of gas per meter was: Ordinary, 49,332 c.ft.; prepayment, 11,631 c.ft. The unaccounted-for gas amounted to 5·19 p.ct., compared with 5·2 p.ct. in the previous year. The power and industrial load is an ever-increasing one, and now amounts to 35 p.ct. of the total output. The increased quantity taken for this purpose during the year was 34,000,000 c ft. The higher cost of materials and wages having increased the cost of manufacture of gas, this will necessitate some increase in the charges for gas, as otherwise a loss will be incurred.

With regard to the price of gas for motive power and industrial purposes, the following joint report by the Borough Treasurer (Mr. H. Kirk) and Mr. Johns has been submitted to the Gas Committee, who have accepted the recommendations contained therein, and are advising consumers of the increased price, to date from the end of June. Ordinary and prepayment consumers are not affected.

In view of the increasing expenditure in connection with the manufacture of gas, it becomes necessary for the Committee to consider whether the price of gas supplied for motive power and manufacturing purposes should be further increased.

It is estimated that, during the financial year ending March 31, 1918, the expenditure of the department will amount to £5000 (approximately) more than the expenditure during the past year, as shown by the following details:

Engineer's Estimate.	Increase.
Coal	£2000
General stores and materials	1500
Wages	1716
Part cost of motor lorry	500
Repairs to turntable	130
	£5846
Less: Additional income from coke sales	846
	£5000

Based on total output of 400 million c.ft. of gas sold for all purposes last year, this amount is equivalent to 3d. per 1000 c.ft.

During the past year the total cost, after deducting the income from residual products, was equal to 1s. 10·43d. per 1000 c.ft.; and after charging interest and sinking fund instalments, the inclusive cost was 2s. 4·48d. The average price obtained for gas sold for motive power and manufacturing was 1s. 10·46d.; while the average price obtained for all gas sold was 2s. 7·46d.

The present scale of charges is as follows:

Lighting.

Per Quarter.	Per 1000 c.ft.	Less.
Less than 25,000 c.ft.	3s. 0d.	5 p.ct.
25,000 to 50,000 c.ft.	2s. 10d.	,,
50,000 to 500,000 c.ft.	2s. 8d.	,,
500,000 and upwards	2s. 7d.	,,
Prepayment supply	3s. 6d.	Net.

Motive Power and Manufacturing.

Per Quarter.	Per 1000 c.ft.	Less.
Less than 200,000 c.ft.	2s. 1d.	5 p.ct.
200,000 c.ft. and upwards	1s. 10d.	,,

The quantity of gas sold for motive power and manufacturing in the past year was 142 million c.ft., of which approximately—

20,000,000 c.ft. was charged at 2s. 1d. per 1000 c.ft.
And 122,000,000 c.ft. ,, ,, ,, 1s. 10d. ,, ,,

It will therefore appear that the greater part of this supply is taken by consumers who use more than 200,000 c.ft. per quarter; and the question arises as to whether the incidence of the scale should not be varied. If the scale were altered as follows:

Per Quarter.	Per 1000 c.ft.	Less.
Less than 1,000,000 c.ft.	2s. 4d.	5 p.ct.
Over 1,000,000 c.ft.	2s. 3d.	,,

the estimated additional income which would accrue on the basis of last year's sales would be £3000, and the increases payable by the various consumers would be:

Per Quarter.	Per 1000 c.ft.	Increase.
Consumers of under 200,000 c.ft., from	2s. 1d. to 2s. 4d.	3d.
,, 200,000 and under 1,000,000 c.ft.,	1s. 10d. to 2s. 4d.	6d.
,, 1,000,000 c.ft. and over	1s. 10d. to 2s. 3d.	5d.

The effect of this alteration would be:

Estimated increase in expenditure	£5000
,, ,, income	3000
,, decrease in net surplus	£2000

The net profit for the year 1916-17 was £3011.

COVENTRY CORPORATION GAS UNDERTAKING.

Good progress (as shown by the encouraging financial results) continues to be made by the Coventry Corporation gas undertaking. Another highly successful year's trading, notwithstanding abnormal conditions, has again been experienced.

The accounts to March 31 show an available surplus of £27,190, against £20,557 the previous year. From the figures submitted by the Gas Committee to the City Council at the last meeting, it appears that the total borrowing powers since the acquisition of the undertaking amount (with nominal additions) to £479,805, of which £51,058 has been repaid out of the sinking fund, leaving the present liabilities £428,747. Against these liabilities there are reserve and sinking funds, invested or waiting investment, amounting to £112,714—leaving a balance of liability of £316,032. During the year, £1942 has been expended on capital account. The total capital expenditure to March 31 last was £488,228; but a sum of £67,000 has been set aside towards meeting the loss of capital consequent on the abandonment of plant at the old works, thus reducing the net total of capital expenditure to £421,288. The revenue for the period from all sources, including the sale of gas and residual products, and the rental of meters, fittings, &c., amounted to £280,348, compared with £215,798 the previous year. The working expenses were £224,678; leaving a gross profit for the year of £55,670, as compared with a gross profit of £48,938 the previous year. Noticeable features were the increased revenue from the sale of gas, amounting to £21,763, and the abnormal advance in the value of residuals, which accounts for an increase of £39,926. From the gross profit for the year, £55,670 has to be deducted for capital and other charges, amounting to £33,818, so that the net profit is £21,852. From this has further to be taken £8219 allocated to new stoves, meters, &c., leaving a balance of £13,632. The sum of £13,557 was brought forward from last year, which makes the total surplus available £27,190. The reserve fund amounts to £16,082, of which £15,846 is invested in War Loan, and £235 is on deposit. The Committee have made the following recommendations to the Council in regard to the amount available for distribution: That £5000 be paid over to the general district fund in aid of the rates, and that the balance of £22,190 be carried forward to the next account.

In submitting the Committee's report to the Council, Mr. T. Quinney drew attention to the fact that the year had been one of unprecedented difficulties. There had been the problem of labour, the difficulty in regard to coal and oil, and in many ways the undertaking had had to go through a considerable amount of trouble. Yet in spite of this the department was able to point to a successful year. The demand for gas had increased year by year. When the gas-works were removed from Coventry to Foleshill, the output was 2,000,000 c.ft. per day; and the possibilities of the new works are calculated to serve the city for twenty years ahead. So great had been the increase in the consumption of gas that within nine years of the removal the amount had gone up something like 111 p.ct. The gas now supplied was 4¾ million cubic feet per day. The record day was Dec. 20 last, when the gas made was 6,390,000 c.ft. In one week the amount of gas produced was no less than 5,740,000 c.ft. per day. Congratulations were offered to the Manager, Mr. Fletcher W. Stevenson, the staff, and the employees on the successful year's work.

The Council adopted the report.

The Committee also submitted a recommendation that an additional carburetted water-gas plant, of a capacity of 2,000,000 c.ft., be installed at the estimated cost of £15,750. In urging the importance of this matter, Mr. Quinney said that they were trying to meet the demand for gas for power purposes, and also to assist the ordinary consumer.

The Council approved the recommendation.

DUNFERMLINE GAS-WORKS.

Report by an Expert.

Owing to interruptions in the supply of gas and trouble experienced by consumers in obtaining an adequate pressure during last winter, the Town Council decided to appoint an expert to make inquiry and report. Mr. John Gillespie, of Glasgow, was appointed; and his report has now been received. He was asked to report on the following points: (1) On the condition and plant at the gas-works, particularly the vertical retorts. (2) As to whether such examination has revealed any defect in the plant or machinery which might account for the recent shortage, as well as the defective quality of the gas, and, if not, as to the cause of such short and defective supply. (3) As to the present capital value of the vertical retorts, and their probable life. (4) As to the productive capacity of the works at the present time, and as to whether it is sufficient to meet prospective developments in the near future. (5) As to any improvement or repairs which should be carried out on the plant and machinery. (6) As to whether there is any systematic method of measuring gas sent out under pressure. (7) As to whether it is desirable to separate the management of the productive department from that of the accounting department.

Mr. Gillespie finds the condition of the plant good, with the exception of the horizontal retorts and the newer vertical retorts. Many of the horizontals are not in good condition, because the renewals—which in the ordinary course of things would have been undertaken last summer—were not carried out, in the expectation that the additional vertical retorts then in course of construction would be completed and working. Of the vertical retorts, there are two designs. The first type, which started to work in March, 1914, seem to be in good condition, and have done good work. The second installation differs in design from the first, and in certain features the reporter considered not to be an improvement on the first. Eight retorts examined and entered after cooling-down were found to be cracked in many places, more especially towards the bottom. The rest of the plant is generally in good condition. The shortage of supply that occurred was due to several causes. The completion of the vertical retorts had, through difficulties connected with war conditions, been delayed far beyond anticipation. The labour difficulty was most serious, as it was found impossible to obtain a sufficient number of trained stokers. There was also serious delay in delivery of coal and to the necessity of using coal from stock. The principal cause of complaint as to defective quality lies in the reduced pressure at which the gas was supplied during the periods of low production, accentuated by the removal of the hydrocarbons required by the Ministry of Munitions.

Having regard to all the circumstances, Mr. Gillespie is of opinion that an error in judgment occurred with regard to the change from horizontal to vertical retorts at the date of maximum demand, and that the situation as regards labour might have been saved if an appeal to the Council for outside assistance had been made at the proper time.

The capital expenditure of the installation compares satisfactorily with that of other similar installations, notwithstanding that the work was contracted for, and carried out, in war time.

As to the productive capacity of the works, the exhausters, scrubbers, purifiers, and station meter are capable of dealing with more gas than will probably be required in 1930. The retorts, condensers, and gasholders will require extension within the next few years.

In regard to repairs necessary, immediate attention should be given to the horizontal retorts (96 in all), and the repair of the eight vertical retorts examined be proceeded with at once. The cracks in the vertical retorts can be repaired by the usual pointing in the seams. As improvements, a larger coal-store should be provided, as well as a supplementary means of raising coal, a larger steam-boiler provided, and portions of the older gasholder repaired at the earliest opportunity.

As to a means of measuring gas under pressure, an adaptation of an ordinary meter is made to suit high pressure.

The reporter is clearly of opinion that the management of the productive department should be separate from the management of the accounting department.

In a supplementary report, Mr. Gillespie adheres to his recommendation that the vertical retorts should be repaired, and that there is great urgency in this matter, having regard to next winter's requirements.

A separate report is furnished by Mr. Alexander Murdoch, of Glasgow, as to the capital expenditure the last five years. Mr. Murdoch states that the books are well and carefully kept, but that a correct system of allocation between capital and revenue has not been adopted. He advises that this allocation should be made when the accounts are passed for payment, and similarly with the wages each week.

Mr. Waddell was asked to give his observations on Mr. Gillespie's report. In his opinion, the root cause of all the troubles at the gas-works during the past winter was that of labour and the difficulty of obtaining the necessary number of men, and that this dominated the whole situation of affairs.

The Special Sub-Committee appointed to deal with the affairs at the gas-works have now made their report; and the whole matter will be dealt with at an early meeting of the Town Council.

Having in mind the probable difficulty in obtaining coal during the coming winter, the Leeds Education Authority have decided to purchase 140 gas-fires, at the price of £2 13s. 6d. each, including fixing, for the Headingley Wesleyan College, which has been taken over by them for the training of teachers.

The Coal Controller has issued instructions to the collieries in Nottinghamshire and Derbyshire referring to the distribution of supplies. The chief points are that no coal shall be allowed into Nottinghamshire and Derbyshire from any other area. Collieries are only permitted to send to certain districts; and under these conditions it is expected there may be increased supplies for London.

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BENZOL PLANT AT KEIGHLEY.

The benzol plant at the Keighley Corporation gas-works at Thwaites, after being at work about a fortnight, was formally visited and inspected last Friday by the Mayor and members of the Town Council, on the invitation of the Gas Committee. The leaders of the party were the Mayor (Mr. F. W. L. Butterfield), Alderman J. Harrison (the Chairman of the Gas Committee), Mr. W. Bailie (the Gas Engineer), and Mr. H. B. Holliday (the Assistant Engineer).

The visitors were conducted over the whole of the undertaking; the new benzol, sulphate of ammonia, and carbonizing plants being described in detail. The benzol plant has a productive capacity of about 90,000 gallons of crude liquor per annum. Profit, it was stated, has not been so much the prime consideration as a readiness to help in the national need; but it is not expected that the new undertaking will involve loss, and only slight alteration after the war will be required to fit the plant for the dehydration of tar for ordinary purposes. The installation is the work of the Chemical Engineering Company, of Hendon, and Messrs. Clapham Bros., Ltd., of Keighley, under Mr. Bailie's supervision. There is an oil washer, scrubber, economizer, coil-still, benzol-still, benzol condenser, and storage tanks; the total cost being about £2100.

Light refreshments followed the inspection. The Mayor, in thanking the Gas Committee, said he did not presume to know much about the history of the Thwaites works, beyond that they were opened in 1876. He hoped that so long as the war lasted the benzol plant, which promised so much success, would continue its patriotic work, and that afterwards it would prove of great commercial importance and be a remunerative investment. Alderman John Harrison remarked upon it being ten years since the Council last inspected the works—the occasion being the starting of a new conveyor. Since then there had been improvements of the greatest advantage to the town; and he believed they had now one of the best plants, if not in Great Britain, at least in Yorkshire. Alderman Harrison paid high tribute to the work of Mr. Bailie and the staff at the works, and said he could assure him that the Committee would assist him in every possible way. Their late Gas Manager (Mr. Laycock) had always urged that the funds should never be less than about £15,000; but now, unfortunately, the funds had got to the rock-bottom. He hoped that when the report of the past year's working came before the Council, they would accept the suggestion that whatever profits there were should go to the working capital fund until they got up (say) to £15,000 again. They had had a better year than they expected. They had estimated a profit of £1500; but he was glad to say it was actually considerably more. Everything seemed to have worked out advantageously. There was no doubt Mr. Bailie had the interests of the undertaking thoroughly at heart, and everything was being carried on to the best advantage.

CALCUTTA PUBLIC LIGHTING CONTRACT.

Some Points in Dispute.

Official records just to hand from the Calcutta Corporation furnish details of various matters in dispute with the Oriental Gas Company. Some of the points under discussion are indicated below.

Lighting Hours.—Certain lamps are being extinguished at 10 p.m. and 1 a.m. The Company contend that the Corporation must keep all lamps alight for at least ten hours per night; and they have submitted bills for the gas consumption of the lamps referred to at this rate. The Corporation contend they are only liable to keep an irreducible minimum of 9000 lights burning for an average of ten hours each night.

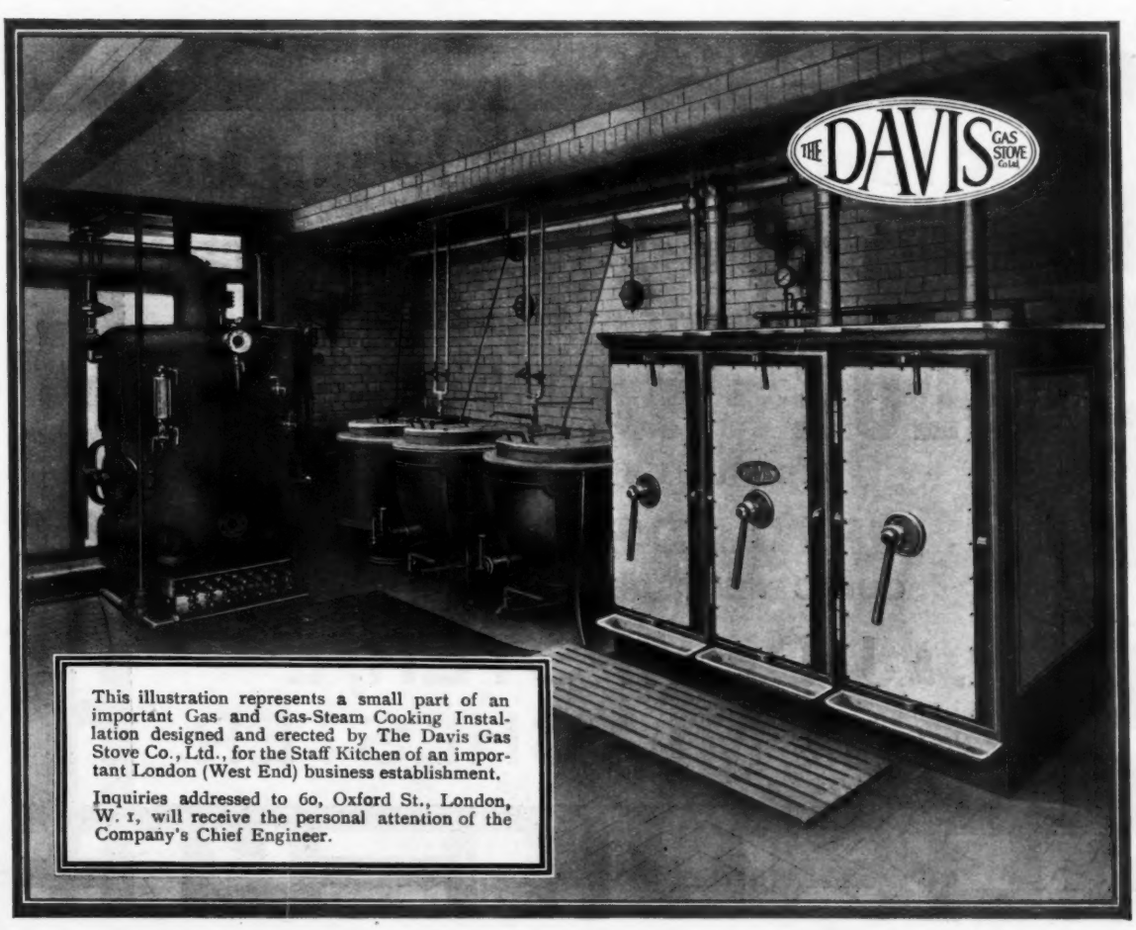
Testing of Burner-Nipples.—In consequence of the increased pressure which came into force on March 1, it was necessary to arrange for fresh tests of nipples to be carried out in the Corporation laboratory. The procedure adopted on all previous occasions has been to test the nipples lighted; and the Corporation contended that this should be continued. The Company, however, objected to this method of test on the present occasion, and first asked that the nipples should be tested unlit. After correspondence, they suggested that the tests should be made with the nipples fitted in the burners, and the gas lit at the nozzles—*i.e.*, as actually in use in the street-lamps.

Discontinuance of Lamps.—The Company have sent in a claim for the cost of gas which would have been supplied to certain lamps during the tenure of the agreement, had they not been discontinued. The Corporation contend that they are only liable to keep the irreducible minimum of 9000 lights burning for an average of ten hours per night, and that they may discontinue altogether or reduce the lighting hours in the case of any lamps over and above this minimum.

Illuminating Power of Gas.—On certain days in March and June, 1916, the illuminating power was found to be defective; and it was decided to deduct a sum from the Company's bills as fines. The Company objected, and filed a suit; but it was agreed that the matter should be referred to arbitration.

Plans Showing Position and Depth of Mains and Services.—The Corporation called upon the Company to furnish plans in respect of certain mains laid by them since the coming into operation of the gas agreement. The Company denied the right of the Corporation to call for plans; and the decision of this question forms one of the matters for arbitration. The point for determination is whether or not the Company are bound to submit plans for approval before laying any mains in any public street.

Damage to Gas-Mains.—Some questions have arisen as to the liability of the Corporation in case of any damage done to the gas-mains by reason of collapsed sewers and otherwise. The dispute really is as to the time within which the Company must prefer any claim for damages, having regard to the provisions of the agreement that such claim must be made within three calendar months from the date of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filling-in of any excavation, while on behalf of the Company it is contended within three calendar months from the filling-in of all the excavations in any road—in other words, from the complete filling-in of the last of the excavations in any road.

On behalf of the Company, proposals for an amicable settlement of some of the questions were made; but after discussion the Corporation resolved that all the matters in dispute with the Company should be decided by arbitration.

"SAFETY FIRST" LIGHTING.

At the last meeting of the London Safety First Council, the Street Dangers Committee reported as follows upon suggestions for the securing of safety. The report was adopted.

The Committee have considered the reference with regard to the suggestion previously made that street-lamp columns should be placed as near as possible to the corners of streets, but not nearer than 2 ft. of the kerb, where the width of the path permits, and, acting upon the advice of the Street Dangers Sub-Committee, desire to point out that this item might deal with others besides street-lamps, and that the arguments in connection with the retention of a 2 ft. minimum may not apply equally to all erections, but that the general question of "Safety First" is best observed by retaining the 2 ft. minimum for thoroughfares subjected to heavy and continuous traffic. Structures such as lamp-pillars, particularly those carrying gas-lanterns, in Central London streets, have, where 21 in. and less from the edge of the kerb, been frequently knocked down by heavy vehicles. By the retention of the 24 in. minimum, the maximum use of the footway is satisfactorily obtained; the space between the lamp-column or other erection and the kerb is not lost, as is largely the case when less than the 24 in. minimum is provided; and the margin of safety is increased.

The minimum of 2 ft. would, it is suggested, be also applicable in regard to sand bins, pillar letter boxes, trees, or guards around the same, and tramway columns—indeed, to any erection of any kind of a temporary or permanent nature where the footway is of the necessary and sufficient width. In this connection, mention may be made of temporary wooden gantries which, in some districts, are not allowed to be erected nearer than 2 ft. of the kerb. Reference should also be made to the bye-laws made by the London County Council on June 30, 1914, for the regulation of lamps, signs, or other structures overhanging the public way, not being within the City of London. By these bye-laws, no lamp, sign, or other structure overhanging the public way is allowed to be nearer the edge of the kerb than 30 in. When full consideration is given not only to the projection of the hub of a vehicle wheel, but also to the sway or overhang of the bodies, and to the projection over the footpath of the bodies of vehicles on roads with a considerable side-hang, or camber, the 2 ft. margin seems necessary for the safety of the public. It is not proposed that this measurement should be taken from any ornamental projection round the base of the structure, but from the main body of the structure at a height (say) of not more than 2 ft. from the level of the footway.

It will doubtless be known that a general practice in the Metropolis is that no footpath or guard kerb in narrow thoroughfares is less than 2 ft. in width, and this width has been found generally to be satisfactory, both as regards use by pedestrians and in providing for the safety of the public against passing vehicles.

The object in fixing this minimum is not only to secure the safety of a pedestrian from accident from falling lamps, and crushing from excessive or encroaching traffic, but is also to secure that he shall be guarded from accident owing to the lantern itself being nearer the edge of the kerb than this provision will ensure.

The minimum of 2 ft. applies to those thoroughfares which are subjected to very heavy and continuous traffic of all kinds. In the case of suburban roads and thoroughfares of a residential character, where the traffic is intermittent and local, the columns would be placed at such a distance from the edge of the kerb as would cause the outer edge of the lantern to be not nearer than 1 ft. from the face of the kerb.

From the artistic point of view, the use is deprecated of standard lamps where the lantern is offset from the column towards the inside of the footway, in order to allow clearance for passing vehicles. Where the footway is narrow, bracket lamps fixed to adjoining property are recommended, particularly where central hung lighting is not obtainable.

It is recognized that there must be positions where from underground structures—vaults, mains, ducts, and cables—it is impossible to carry out the recommendation fully. In all such cases the local authorities will, of course, deal with the matter in the best way possible, as advised by their engineer.

The Committee have reconsidered the suggestion made under the heading "Lighting of Street Obstructions at Night," and recommend that it should be altered to read as follows:

> It is suggested that, except in cases of openings made by tramway authorities, watchmen's lamps, where hung transverse to the direction of the traffic at the ends or sides of trenches or other openings or obstructions in all highways, should not be more than 4 ft. apart, nor more than 4 ft. in height from the surface of the carriage-way, and that illuminated warning boards inscribed "Beware of Obstructions," or other suitable wording, should be utilized where possible.

The Committee have considered a suggestion made by Dr. F. L. Langdon Down, Chairman of the Teddington Urban District Council, that street refuges and other obstructions in the centre of the roadway should show a white light in both directions. The Street Lighting Sub-Committee, who have considered the suggestion, state that they believe it is generally recognized that street refuges should be lighted, but suggest that the light should in all cases consist of more than one lamp or more than one mantle (of smaller candle power) within the same lantern, or by a subsidiary lamp, with a view to guard against a single light being inadvertently extinguished or put out of action by the breaking of the lamp or mantle—thus leading to possible accidents.

The Committee recommend the Council to authorize that a communication embodying the foregoing suggestions be addressed to the local authorities within the Greater London area.

The Committee have had under consideration a suggestion which has been made that red or green lights should be shown at tramway stopping places. The Lighting Sub-Committee report that the suggestion of having illuminated signs to indicate stopping places is a useful one, and might receive special attention in cases where the distance between them is great, and

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particularly at uphill stopping-places. So far as possible, a stopping-place should be arranged to coincide with a lamp-post, so that the light from the lamp might be used to illuminate the necessary sign. Neither red nor green should be used for this purpose; red should be confined to indicating danger obstructions or fire alarms. But "By Request" and compulsory stopping places might be indicated, respectively, by yellow and deep orange coloured illuminated signs,

The Committee recommend the Council to invite the tramway authorities in the Greater London area to adopt the foregoing suggestions.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *July* 2.

Owing to the cooler weather prevailing, moderate quantities of pitch have been shipped, and to-day's price is 38s. per ton in bulk at makers' works. Creosote is steady at from 4¼d. to 4½d. per gallon, and there is a strong demand for this article for various purposes. Solvent naphtha continues to improve. The price is firm at 2s. 3d. per gallon net and naked at makers' works.

A fair number of orders are being placed for sulphate of ammonia for prompt; buyers wishing to take advantage of the lowest price that prevails for the early months.

Tar Products in the Provinces.

July 2

Markets for tar products remain the same. The price of pitch is nominal.

The average values for gas-works products during the week were: Gas-works coal tar, 20s. 6d. to 24s. 6d. Pitch, East Coast, 16s. 6d. to 17s. 6d. per ton; West Coast—Manchester 15s. 6d. to 16s. 6d., Liverpool 16s. 6d. to 17s. 6d., Clyde 17s. to 18s. nominal. Benzol, 90 p.ct., North, 10½d. to 11½d.; 50-90 p.ct., naked, North, 1s. 3d. to 1s. 4d. Toluol, naked, North, 2s. 3d. Coal tar crude naphtha, in bulk, North, 6½d. to 6¾d. Solvent naphtha, naked, North, 1s. 8d. to 1s. 9d. Heavy naphtha, North, 1s. 2d. to 1s. 3d. Creosote, in bulk, North, 3¼d. to 3⅜d. Heavy oils, in bulk, North, 3⅜d. to 4¼d. Carbolic acid, 60 p.ct., East and West Coasts, 3s. 4d. naked. Naphthalene salts, 80s., bags included. Anthracene, "A" quality, 3d. per unit; "B" quality, 1½d. to 2d.

Manchester District Tar Prices.

The average price realized for tar in the Manchester district, based on the value of the products for the months of April and May, was 27s. 4d. per ton for each month.

COAL TRADE REPORT.

Northern Coal Trade.

There has been a rather more equal output and shipment of coal—the former having been temporarily reduced by the local holidays. The steam coal trade is much firmer in consequence, and work must now be expected to be a little fuller. Best Northumbrian steams are steady at 30s. per ton f.o.b.; for second-class steams, the price is from about 21s. 6d. to 24s.; and steam smalls are still in plentiful supply, but are on the whole a little firmer at the last quotations given. In the gas coal trade the demand is steady, and prices are generally maintained; while there seems to be the expectation of rather improved values for second-class coal. For best Durham gas coals from 24s. 6d. to 25s. 6d. per ton f.o.b. is the current quotation. Second-class gas coals are from 17s. to 18s.; and for "Wear Specials" the price is near 28s. 6d. to 29s. 6d., with a good demand for the latter kind. Now that the Coal Controller's "directions" [p. 29] seem to be settled, it is hoped that some of the large contracts for gas coal will soon be decided; but as far as can be judged, the changes will not be great from those that have ruled for a year or so—that is generally, though there must be local exceptions. As to Durham coal, there is a strong home demand. This had in degree limited the export; but the variation in the actual realized price has not been great on the average. There are heavy freights—gas coal, Tyne to London 15s. 6d. to 17s. 6d., for instance; and to neutral ports the rates are heavier, owing to scarcity of tonnage. In the coke trade, prices are firm. Gas coke is quoted from 31s. to 32s. 6d. per ton f.o.b., according to kind and place of shipment.

A licence has been granted by the Board of Trade to the United Flexible Metallic Tubing Company, Ltd., to manufacture under a German patent for flexible metal tubing.

A news telegram states that the German Press is showing serious alarm regarding various economic matters. The great scarcity of coal has compelled the authorities in Berlin to cut down the lighting of the city generally by two-thirds.

The Spenborough District Council have appointed a Special Committee to consider the question of the Council acquiring stocks of coal which, if necessary, might be sold to people at a reasonable price. Such coal will probably be stored in the gas-works yard.

It is announced that the undertakings of Messrs. Chance and Hunt, Ltd., of Oldbury, Wednesbury, and Stafford, are to be consolidated with those of Messrs. Brunner, Mond, & Co., Ltd., who are acquiring a majority of the ordinary shares of the former concern.

The Halifax Corporation Gas Committee have accepted the tender of Messrs. W. C. Holmes & Co., Ltd., of Huddersfield, for the supply and erection at the gas-works of a new cyanide washer, for the sum of £2100. Messrs. Holmes are to take down and retain possession of the scrap material from the existing machine.

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Tipton Gas-Works Accounts.

Mr. William Prince, the Engineer and Manager of the Tipton Urban District Council Gas-Works, has forwarded a copy of the accounts of the department for the year ended March 31 last. The revenue account shows receipts amounting to £29,985, as compared with £28,416 the previous year; the balance of gross profit carried to profit and loss account being £7164, as against £7696. To this has to be added £4 bank interest, making a total of £7168. Interest on mortgages amounts to £1403, and sinking fund charges for redemption of loans to £3250, leaving a net surplus of £2515 to be carried to the accumulated profits account, bringing this account up to £10,806. The quantity of coal carbonized was 12,434 tons, as compared with 12,354 tons a year ago; the gas made being 160,163,000 c.ft., as compared with 157,329,000 c.ft. The make per ton of coal carbonized amounted to 12,880 c.ft. last year, and to 12,735 c.ft. for the preceding twelve months. In neither year was any water gas added. Leakage, condensation, &c., figures at 11·67 p.ct., as against 8·23 p.ct.

Reduction in Price at Lancaster.—The Lancaster Town Council have agreed to a recommendation of the Gas Committee that, until further notice, the price of gas (other than for motive power) shall be as follows: For ordinary consumers, 2s. 7d. per 1000 c.ft., instead of 2s. 10d. as at present (less 2d. discount); for prepayment meters, 30 c.ft., instead of 27 c.ft. as at present, for 1d.

Loss on the Portland Gas-Works.—When the half-yearly gas-works accounts came before the Portland Urban District Council, Mr. Allen said it was not a very good balance-sheet. Coal had cost £300 more for the same quantity than it did in the previous year; and this accounted for £300 of the loss of £1024 on the half-year's working. Their losses had been rather heavy; but repairs were doing it. Mr. Kelly agreed that it was not a report one liked to look at. It was not the fault of the Committee or the Manager, but of the Council generally, or the Committee of years gone by. The works had been allowed to go back. Instead of keeping them in good repair, previous managers had striven to show a surplus. To put the concern in order would cost somewhere near £2000; and unfortunately the district rate would have to face it. The works had been a burden ever since the Council took them over. Mr. Edwards remarked that, although the price of coal had increased, the charge for gas had been raised 6d. per 1000 c.ft. The make of gas per ton had gone down from 12,259 c.ft. to 11,200 c.ft., while the total amount of unaccounted-for gas had risen from 10 to 18 p.ct. Mr. Allen replied that there used to be no proper check on the amount of gas made. The report was adopted. Writing in the local "Telegram," "Nemo" says: "It would almost have paid the Council better to have shut the works up the moment they had paid the original £28,000 for them; for from first to last they have spent about another £28,000 on works that have been a burden ever since they passed into the Council's hands. If ever anyone did believe in municipal enterprise, association with these works would knock the idea out of their heads."

Protected Trades and Tribunal Exemptions.

At the session of the Lewisham Tribunal on Monday of last week, a letter was read from Mr. Wilfrid Wastell, the Secretary of the South Suburban Gas Company, drawing their attention to a report in the "JOURNAL" of certain proceedings before the Southwark Tribunal, which resulted in a decision exactly the reverse of that given by the Lewisham Tribunal a week earlier. From the cutting enclosed, the Military Representative was reported to have stated that, acting under the latest instructions from the War Office, he was not asking for the withdrawal of Tribunal exemption certificates in cases such as the Company's. Apparently the Lewisham Military Representative (Captain H. E. Harry) had not received these instructions at the time the Company's cases were before the Tribunal; and in view of the altered position, he (Mr. Wastell) asked that the matter be submitted to the Tribunal, with the view, if possible, of restoring the exemption certificates which had been withdrawn. Captain Harry: I have no instructions, and I do not know of any being given. The Chairman (Mr. F. Mead): I think Mr. Wastell might be informed that if at any time the certificates granted by the Munitions Area Recruiting Officer are withdrawn, we will re-hear the Company's applications. The Clerk: You included that in your order of last week. Captain Harry: The Company are safeguarded in every way.

Prepayment Meters in Manchester.—At present there are nearly 78,000 prepayment meters in use in Manchester, and the money deposited in them is collected once every eight weeks. The aggregate weight of coppers for the year amounts to about 285 tons. Before the war the collection was made every six weeks.

Alleged Gas-Works Nuisance at York.—At the York City Council, a memorial, signed by 52 residents in Monkgate and district, was read complaining that there was a greatly increased nuisance of smoke, dirt, and noise from the gas-works, and asking the assistance of the Council in its abatement. The memorial was referred to the Health Committee. Subsequently, Mr. H. E. Bloor (the Manager of the Gas Company) attended before the Committee and fully explained the methods adopted to prevent the nuisances complained of. He stated that alterations were being carried out which, when completed, would, it was hoped, materially reduce the discharge of smoke; while as to the complaint from dust, there had been trouble from this, but it was now practically abated by the covering-in of the machinery. The noise he was afraid could not be reduced. But for the new machinery and works being carried out, which had been rendered necessary by the shortage of manual labour, the supply of gas during the past two years would have been seriously interfered with, if not stopped, to the great disadvantage and loss to the citizens. The Directors and himself were anxious to do all reasonably in their power to avoid creating nuisances of any kind; and he would consider various suggestions made to him in regard to the matter. The Inspector of Nuisances was instructed to keep the works under observation.

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MANCHESTER. NOTTINGHAM.

Increase in Price at Salford.

The price of gas was under discussion at a meeting on Friday of the Salford Town Council. At a previous meeting, the Gas Committee's recommendation to increase the price by 4d. per 1000 c.ft. was referred back to the Committee, along with an amendment that 2d. should be knocked off the discount allowed. The Gas Committee at Friday's meeting recommended that the discount of 4d. per 1000 c.ft. allowed to consumers by ordinary meters should be reduced to 2d., and that the price of gas should be advanced by 2d. Further, that the supply of gas through prepayment meters should be reduced from 27·27 to 25 c.ft. for 1d. Alderman Phillips (the Chairman of the Committee) said the question of gas production was causing considerable concern all over the country. It was said they were charging more for gas than Manchester. The fall in the consumption of gas in Salford was much greater than in Manchester, because the bulk of the Salford supply went to small consumers. Manchester had many large consumers, while Salford had very few. During the three years of war, the cost of manufacturing had increased by £126,450. The increased amount received for the commodity amounted to £91,405, and for residuals £16,994. By Act of Parliament they were forced to pay £10,000 towards the relief of the rates; and the present deficit was £24,939. If they adopted the Committee's recommendation, this could be wiped out in three years. and the undertaking would have money in hand. They must agree to increase the price, or saddle the future generation of consumers with a considerable debt. Eventually, the Committee's recommendations were adopted.

National (Unemployment) Insurance.—The Umpire has decided that contributions are payable under the National Insurance (Part II.) (Munition Workers) Act, 1916, in respect of workmen described as sheet metal workers, and engaged in the manufacture of portable gas-heated boilers, domestic gas-meters, and sheet metal generators for acetylene or petrol gas.

Wages at Dundee.—The National Union of General Workers having made an application for an increase of wages to unskilled and semi-skilled employees at the gas-works, a discussion took place as to what was the standard rate for labourers. At present these men are paid 8¼d. an hour; and it was agreed to give them another 2s. 3d. a week, so as to bring the rate up to the 9d. which was declared to be the standard.

Ilkley Strike Ended.—The strike of municipal council employees at Ilkley ended last Tuesday; the men accepting the Council's offer of an additional 2s. per week war bonus, though the gas workers, in particular, had contemplated standing out for 6s. per week. During the short dispute, a number of residents gave voluntary service which prevented the stoppage of the gas supply to the town. The town and its three military hospitals are much dependent on gas for cooking.

Wages at Shipley.—The Shipley District Council have approved in principle, with the proviso that actual apportionment must be settled by the various committees concerned, so as to meet special cases, the Finance Committee's recommendation granting a further advance of 5s. per week on pre-war rates—making 12s. in all—in the pay of Council workmen, particularly in the gas, electricity, and highways departments. The advances are retrospective as from May 1.

South Metropolitan Gas Company's Increase in Price.—In explanation of the action of the Directors of the South Metropolitan Gas Company in increasing the price of gas to 3s. 1d. per 1000 c.ft., Mr. F. M'Leod (the Secretary) pointed out to a representative of the "Daily Telegraph" that the rate charged immediately before the war was 2s. 2d., and while the cost of production had about doubled, the price of gas to the consumer had been increased by only about 40 p.ct. This result had been rendered possible by the material increase in prices obtained by the Company for certain residuals. But, apart from this, the Company had been anxious to keep the price as low as possible, in view of the fact that the greater part of the district they supply is inhabited by the working classes and people of small means.

Swansea Corporation and the Calorific Standard.—Reporting to the Swansea Corporation upon an inquiry which took place last April before Mr. Garnham Roper, with regard to the opposition of local authorities and railway companies to Orders under the Calorific Standard Act, the Town Clerk said that, in spite of the efforts made by Mr. G. J. Talbot, K.C., for the railway companies, by himself, on behalf of the Corporation, and by Mr. E. Harris, for the Swansea Rural District Council, they had been unable to get the Board to agree to all the clauses and amendments proposed. He added that Mr. Talbot and himself had suggested that the whole matter should be made the subject of a Departmental Inquiry. Subsequently, the Board of Trade addressed a letter to the Corporation, in which they say that, "while the Board are fully alive to the desirability of an early determination of the technical matters affecting the supply of gas generally which have been raised by various interests, they do not feel themselves justified in deferring the consideration of the applications for Orders under the Act pending the result of the contemplated investigation into those matters."

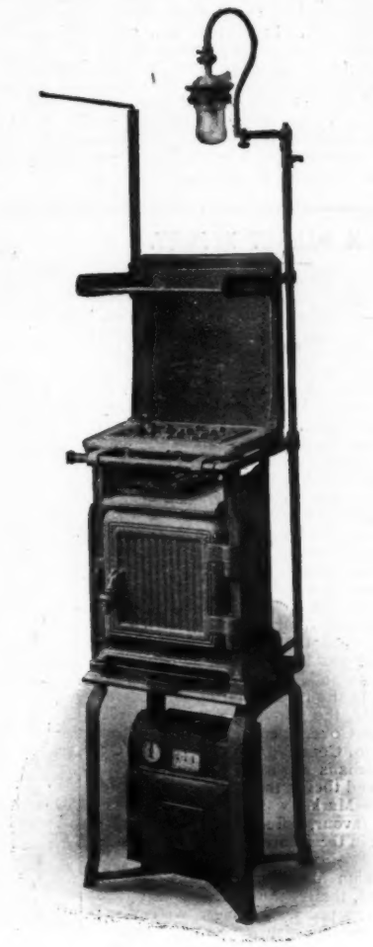
NEWSPAPERS FOR NEUTRAL COUNTRIES.

The Secretary of the War Office has issued the following order:

> The public are informed that newspapers and other printed publications will not be sent to Neutral Countries unless they are posted direct from the office of publishers or newsagents who have obtained permission from the War Office for this purpose. Persons desiring to send newspapers, &c., to Neutral Countries should, therefore, give their orders for execution to publishers or newsagents who have obtained such permission.

The Publisher of the "JOURNAL" has obtained the required permission of the War Office; and he will, on receipt of instructions, forward copies direct from the office to any neutral country.

Slot Installations



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Biddulph Gas-Works Loss.—For the ensuing year, the rates in the Biddulph urban district are to be 5s. in the pound, which is an increase of 1s. 5d. on last year. This state of affairs is stated to be largely due to a loss on the gas-works, which one member of the Council declares will always have to be supported out of the rates.

Gas Consumption in Germany.—The latest statistics of gas production by German gas undertakings, collected and issued by the Central Gas Publicity Bureau, which has its headquarters in Berlin, relate to the months of December and January last. They are in continuation of the figures for Sept.-Nov. last given in the "JOURNAL" for April 17 (p. 104). In December, 1916, 747 German gas-works produced 3·2 p.ct. more gas than in December, 1915, and 15·1 p.ct. more than in December, 1914 (which month showed a great reduction on December, 1913). In January last, 743 works produced 3·4 p.ct. more gas than in the corresponding month of 1916, and 11·9 p.ct. more than in January, 1915. The January figures for consumers' meters show that in the two years the number of ordinary meters in use increased by 14·6 p.ct., and of prepayment meters by 30·8 p.ct. In January last, 44 works were supplying, in all, 15,375 consumers at a flat-rate per month or quarter—thus dispensing with that number of meters, the supply of which in Germany has not kept pace with the demand since the outbreak of war.

Bispham and an Electricity Deficit.—It was reported at a meeting of the Bispham-with-Norbreck Urban District Council (it was probably the last "budget day" before the amalgamation of the district with the borough of Blackpool) that the electric lighting undertaking expenditure was £2788, and the receipts £1993, a net gain of £90 on the estimates, due to the increased charges. The total deficiency was £795, equal to a 7d. rate; and the estimates this year provided for a deficiency of £965, equal to an 8d. rate.

Ilford Gas Company and Electricity Audit.—A letter from the Local Government Board was read by the Clerk at the last meeting of the Ilford Urban District Council, with reference to an appeal submitted to the Board against the allowance at the audit of the accounts of the Council for the year ended March 31, 1914, of certain expenditure included therein relating to the electricity undertaking. The Board forwarded a copy of a letter they had addressed to the appellants, the Ilford Gas Company, stating, *inter alia*, that, in all the circumstances, the Board consider the case is one in which they may properly exercise the power conferred on them by section 4 of the Poor Law Audit Act, 1848, as applied to the audit of the accounts of the Council, to determine the appeal on the merits, and accordingly decide that the accounts for the year named, so far as they are affected by the appeal, shall stand as allowed at the audit.

STOCK MARKET REPORT.

THE only thing the matter with business last week on the Stock Exchange was that there was so little of it—the House was "sick of a calm." The persistent paucity is becoming chronic; but this scarcely makes it less hard to bear. Towards the close of the week, indeed, business was tapering-off to a very fine point; for there was a longer break than usual staring members in the face. The House was to be closed on Saturday and on Monday too—yesterday being a special extra Bank Holiday to allow depleted bank staffs to make up their half-year's accounts. However, notwithstanding the quietude, the general tone of markets was satisfactory, and prices in many departments even improved upon their firm positions of the preceding week. Among the favouring factors to stimulate advance were the continued pressing-back of the enemy upon the Western front, the glad tidings of the arrival of United States forces upon the scene, and the smart prosecution of war measures in Greece. To these might be added the Minister of Munitions' oration in the House of Commons.

Thus fortified, the gilt-edged had a cheerful week. Home Government issues were firm, and War Loan, Consols, and others, and Colonial and Indians improved. Home Rails hardly sustained their strength up to the close. The American Market was firmer, and Argentines were in favour, influenced perhaps more by confidence in the future rather than present conditions.

In the Foreign Market, Brazilians were in special demand, thanks to the rising exchange and general prospects. Japanese were firm; but Russian and Spanish gave way. Among the Miscellaneous, Rubber was dull, and Textiles eased away. Iron and Steels, Shipping, and Breweries were well supported.

Business in the Gas Market, as might be expected in such a quiet time, was on a very moderate scale, and not even the biggest issue could count a dozen bargains. Movements in prices marked and in quotation were irregular. Gas Light ordinary was a point easier, and South Metropolitan receded three points, in view of the rise of 5d. in the price of gas, involving a reduction in the rate of dividend to 4 p.ct. for the half year now commencing. Imperial Continental recovered a point.

The Money Market was quite easy almost up to the close, when there was a good demand as usual at the half-year's end. Rates for discount relaxed.

Bargains done for cash during the week were as follows: On Monday, Gas Light ordinary 71⅛, 71½, 72, ditto maximum 57¼, ditto debenture 56, Monte Video 8¼, South Metropolitan 77, South Suburban 76¾, 77¼. On Tuesday, British 33⅛, 33¾, ditto Norwich debenture 60, Commercial 4 p.ct. 73⅛, 73¾, 74, Gas Light ordinary 71, 71⅛, 72, ditto maximum 57, 57¼, Imperial Continental 82, 83, Lea Bridge 85⅛, 85½, Tottenham "B" 69¾, 70. On Wednesday, Bombay 4 13/16, 4 15/16, 5, Imperial Continental 81, 82, South Metropolitan 76¾. On Thursday, Brentford "A" 82½, 82¾, ditto "B" 80⅜, Gas Light Ordinary 71, ditto preference 73¼, ditto debenture 56⅛, 56⅜, Imperial Continental 81, Metropolitan of Melbourne 94⅛, San Paulo preference 8, South Metropolitan 75. On Friday, Gas Light ordinary 70⅜, 71⅛, 71¾, 72, ditto preference 73, 73⅛, ditto debenture 55⅞, South Metropolitan, 74½, 75, 75⅛, 76, Watford "A" 108⅜, 108½, ditto "B" 85⅜, 85½.

The Bank rate is 5 p.ct., as fixed on April 5.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue.	Share.	When exs. Dividend.	Previous Div or Dividend and Bonus.	Last Dividend.	NAME.	Closing Prices. July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
£			p.c.					
175,472	Stk.	Mar. 10	4	4%	Aldershot 4 p.c. Pref.	..	53—63	..
1,551,868	,,	April 8	2½	5⅛%	Alliance & Dublin Ord.	59—64	50—55	..
874,000	,,	July 10	4	4%	Do. 4 p.c. Deb.	76—79	58—63	..
280,000	5	April 29	7½	4/6	Bombay, Ltd.	5⅞—6⅜	4⅜—5⅛	4 13/16—5
50,000	10	Feb. 26	16	15/-	Bournemouth Gas and Water { 10 p.c. B 7 p.c. Pref. 6 p.c. 4 p.c. Deb.	29—30	24—26	..
883,110	10	,,	7	7/-		15—15½	10⅜—11½	..
115,000	10	,,	6	6/-		13½—14	9½—9⅝	..
159,740	—	—	—	4%		..	6/-—7/*	..
992,045	Stk.	Feb. 26	14	55/-	Brentford A Consolid.	261—266	81—84	82½—83½
734,920	,,	,,	11	53/9	Do. B New	204—209	79—82	£0½
55,000	,,	,,	5	5%	Do. 5 p.c. Pref.	109—111	83—88	..
221,400	,,	June 11	4	4%	Do. 4 p.c. Deb.	91—93	65—67	..
217,380	,,	Feb. 26	11	10%	Brighton & Hove Orig.	208—213	150—155	..
244,300	,,	,,	8	7%	Do. A Ord. Stk.	154—159	102—107	..
530,000	20	Mar. 26	12½	22/6	British	44—45	33—34	33⅛—33½
120,000	Stk.	June 26	4	4%	Do. 4 p.c. Deb. Stk.	88—90	64—66*	..
245,771	,,	,,	4	4%	Buenos Aires 4 p.c. Deb.	85—87	5⅛—56*	..
100,000	10	—	—	—	Cape Town & Dis., Ltd.	1⅜—2⅛	2⅛—2⅜	..
100,000	10	—	—	4½%	Do. 4½ p.c. Pref.	4—6	6—7	..
100,000	Stk.	June 26	4½	4½%	Do. 4½ p.c. Deb. Stk.	70—75	60—65*	..
157,150	,,	Feb. 26	5	5%	Chester 5 p.c. Ord.	108—110	79½—80½	..
1,513,280	,,	Feb. 12	5/9/4	49/4	Commercial 4 p.c. Stk.	106—108	72—74	73½—74
560 000	,,	,,	5½	46/8	Do. 3½ p.c. do.	103—105	66—68	..
475,000	,,	June 11	3	3%	Do. 3 p.c. Deb. Stk.	69½—71½	51—53	..
800,000	,,	,,	4	—	Continental Union Ltd.	76—79	39—41	..
200,000	,,	,,	7	—	Do. 7 p.c. Pref.	115—118	60—62	..
278,400	—	—	—	11⅛%	Croydon B and C 7 p.c..	..	170—180	..
—	—	—	—	10%	Do. E	..	..	..
492,270	Stk.	—	6	5⅛%	Derby Con. Stk.	123—125	95—100	..
55,000	,,	—	4	4%	Do. Deb. Stk.	102—104	80—83	..
1,002,180	10	July 29	10	7/6	European, Ltd.	17½—18	11½—12½	..
16,313,430	Stk.	Feb. 10	4/17/4	42/-	Gas Light and Coke { 4 p.c. Ord. 3½ p.c. max. 4 p.c. Con. Pref. 3 p.c. Con. Deb. 10 p.c. Bonds	98—102	70—72	70½—72
2,600,000	,,	,,	3½	3½%		76—79	56—58	57—57½
4,062,235	,,	,,	4	4%		96—99	72—74	73—73½
4,674 850	,,	June 11	3	3%		72½—74½	55—57	56—56¼
130,000	,,	,,	10	10%		..	..	..
258,740	,,	Mar. 12	5	4½%	Hastings & St. L. 3½ p.c.	87—89	50—55	..
70,000	10	April 29	11	6%	Hongkong & China, Ltd.	16½—16¾	7½—8½	..
26,600	—	—	—	9½%	Hornsey 7 p.c..	..	120—130	..
181,000	Stk.	Mar. 12	7⅞	7⅛%	Ilford A and C.	151—154	102—107	..
65,780	,,	,,	6⅜	5⅞%	Do. B	115—118	80—85	..
65,500	,,	June 26	4	4%	Do. 4 p.c. Deb	92—94	66—69*	..
4,910,000	,,	May 14	9	4½%	Imperial Continental	150—160	80—85	81—83
1,235,000	,,	Feb. 12	3½	3½%	Do. 3½ p.c. Deb. Red.	84—86	62—65	..
235,242	,,	Mar. 12	6½	6½%	Lea Bridge Ord. 5 p.c.	119—121	85—90	85⅛—85½
2,498,905	,,	Feb. 26	10	5%	Liverpool 5 p.c. Ord. { A B	211—213 146—148	81—83	..
306,083	,,	June 26	4	4%	Do. 4 p.c. Pr. Deb. Stk.	..	72—74	..
75,000	5	June 11	6	2/-	Malta & Mediterranean	4⅛—4⅜	3¾—4⅛	..
250,000	100	April 1	4½	4½%	Met. of Melbourne { 4½ p.c. Deb.	99—101	88—98	94½
541,920	20	May 28	4	6/-	Monte Video, Ltd.	11⅛—12	8—8½	8¼
1,875,892	Stk.	July 29	4½	4½%	Newcastle&Gatsh'dCon.	98½—99½	70½—71	70⅝
529,705	,,	June 26	3½	3½%	Do. 3½ p.c. Deb.	82—83	71—73*	..
55,940	10	Feb. 26	7/14/0	7/-	North Middlesex 7 p.c..	14—15	10—11	..
300,000	Stk.	May 14	8	8%	Oriental, Ltd.	117—122	104—106	..
60,000	5	Mar. 26	10	1/-	Ottoman, Ltd.	7⅛—7⅜	2—3	..
60,000	50	Feb. 26	13	12½%	Portsea, Island B	128—131	92—97	..
100,000	50	,,	12	11½%	Do. C	118—121	85—90	..
52,000	50	,,	10	9%	Do. D	..	..	..
249,980	5	April 29	8	—	Primitiva Ord.	5⅛—6	1⅞—2⅛	..
499,960	5	June 26	5	2/6	Do. 5 p.c. Pref.	4⅜—5	2⅜—3⅛	..
521,600	100	June 2	4	4%	Do. 4 p.c. Deb.	91—93	78—80	..
—	—	—	—	4%	Do. ,, ,, 1911	..	..	..
346,198	Stk.	June 26	4	4%	River Plate 4 p.c. Deb.	85—87	57—61*	..
150,000	10	May 14	6	6/-	San Paulo { 6 p.c. Pref. 5 p.c. Deb.	10¼—11	7⅞—8⅛	8
125,000	50	July 1	5	5%		47—49	42—44	..
135,000	Stk.	Mar. 12	10	10%	Sheffield A	223—224	..	..
209,984	,,	,,	10	10%	Do. B	223—224	178—182	..
523 500	,,	,,	10	10%	Do. C	220—222	..	..
90,000	10	May 28	9	6/-	South African.	10½—11½	8½—9½	..
6,609,895	Stk.	Feb. 10	5/4/0	46/8	South Met. 4 p.c. Ord.	111—113	74—76	74½—77
1,895,445	,,	July 10	3	3%	Do. 3 p.c. Deb.	72¼—74½	56—58	..
224,320	,,	Feb. 26	8½	8%	South Shields Con. Stk.	157—159	140—142	..
952,795	,,	,,	6	4⅞/4	S'th Suburb'n Ord. 5 p.c.	114—116	76—78	76½—77¾
60,000	,,	,,	5	5%	Do. 5 p.c. Pref.	110—112	77—79	..
135.000	,,	,,	—	4⅞/4	Do. West Kent	..	..	..
187,558	Stk.	June 26	5	5%	Do. 5 p.c. Deb. Stk.	116—118	83—88*	..
647,740	,,	May 14	5	5%	Southampton Ord.	99—102	76—78	..
120,000	,,	Feb. 12	7½	5%	Tottenham District { A 5 p.c. B 3½ p.c. 4 p.c. Deb.	135—138	95—100	..
782,275	,,	,,	6	3½%		115—117	68—73	69¾—70
181 255	,,	June 26	4	4%		87—89	63—65	..
182 380	10	Dec. 30	5	—	Tuscan, Ltd.	5—6	1—2	..
149,900	10	July 1	5	5%	Do. 5 p.c. Deb. Red.	93—95	60—65	..
236,476	Stk.	Mar. 12	5	5%	Tynemouth 5 p.c. max.	103½—109½	89—91	..
					Wandsworth, Wimbledon, and Epsom—			
30,000	,,	Feb. 26	8⅜	80/-	Wandsworth A 5 p.c.	151—156	114—119	..
255 636	,,	,,	6¼	65/-	Do. B 3½ p.c.	129—134	99—101	..
108,075	,,	,,	5/17/8	56/-	Do. C 3½ p.c.	110—115	86—91	..
352,000	,,	,,	6¼	58/9	Wimbledon 5 p.c.	117—122	88—93	..
98,000	,,	,,	6⅜	65/-	Epsom 5 p.c.	121—126	96—101	..
88,416	,,	June 26	3	3%	3 p.c. Deb. Stk.	66—69	50—53*	..

* Ex. Div.

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